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The Grimmiaceae (Musci) in Maine. II. *Schistidium*

Bruce Allen[1]

In Maine *Schistidium* is a commonly encountered genus of small, dark-green plants nearly always found on bare rock. The genus occurs in riparian, mesophytic and xeric habitats. One species, *Schistidium maritimum*, is restricted to the seashore where it grows within reach of saltwater spray. Most *Schistidium* species have short, erect (sometimes hyaline-tipped) leaves and all are strongly costate. The genus typically has short, broad, immersed capsules and well-formed, haplolepideous peristome teeth. *Schistidium* can be mistaken for *Hedwigia* which also grows on bare rock. *Hedwigia* is a more robust moss with a glaucous-green color, ecostate leaves and no peristome teeth. Confusion is much more likely with *Grimmia*, indeed both genera have identical gametophytes and are sometimes treated as a single genus. *Schistidium* differs in having systylius capsules, i.e. the columella remains attached to the operculum after capsule dehiscence and is shed along with the operculum, greatly enlarged perichaetial leaves and poorly developed stomata. Systylius capsules have evolved several times in the mosses but their function is unknown. Bremer (1981) suggests it enhances spore dispersal by carrying along large numbers of spores with the columella when it is detached. Alternatively, the advantages of a systylius capsule may lie in the fact that the operculum remains attached to the capsule by the columella - which therefore is only partially open - for some time after dehiscence. Although this condition probably decreases the number of spores released, it may be beneficial in reducing desiccation and in limiting spore dispersal to times of more optimal conditions for the establishment and germination of spores, i.e. during the period between drying and wetting when the peristome teeth undergo hydroscopic motion.

Hyaline-tipped leaves and sinuose leaf cells are characters generally associated with the Grimmiaceae. These two characters are variously expressed throughout the family, and have been considered adaptations to xeric conditions (Lorch 1931, Tallis 1959). In *Schistidium* these features apparently have a primary genetic basis since their expressions were modified but not eliminated by long-term, moist, culture conditions (Bremer 1981).

Calyptra characters have often been emphasized in the *Grimmiaceae*, e.g., the presence of small, non-plicate calyptrae separate the Grimmioideae (*Grimmia* and *Schistidium*) from the rest of the family. However, calyptra form (mitrate vs. cucullate), taxonomically used in *Schistidium*, is unreliable for two reasons. The

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calyptra in *Schistidium* is so small and fugacious that it usually can not be found even in material with sporophytes. More importantly, the distinctions between a cucullate and mitrate calyptra in such a small structure are minor and in fact both types can be found within single species or even single collections.

Schistidium Spreng.

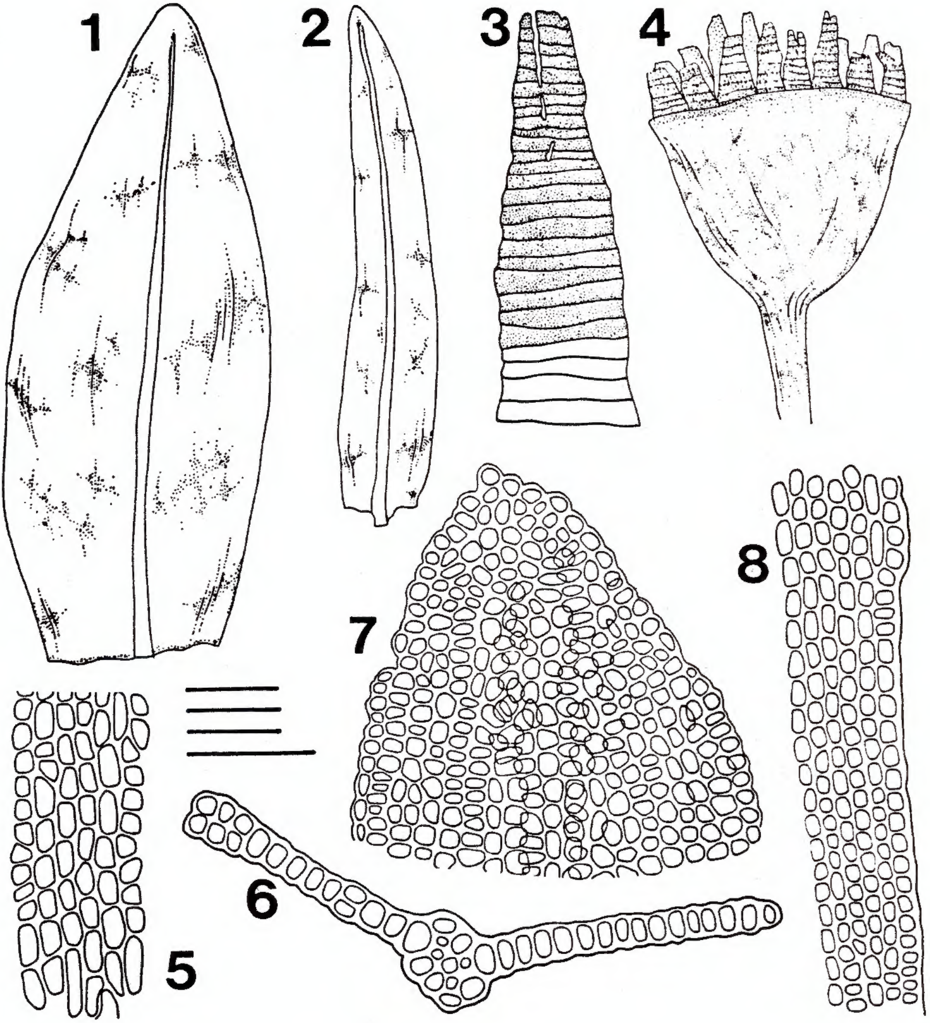
Leaves erect to erect-patent when dry; margins plane or revolute; hair-points present or absent; basal cells not strongly differentiated. Perichaetial leaves elongated, distinctly larger than vegetative leaves with stronger, usually excurrent costae. Autoicous. Capsules symmetric, immersed; setae straight; columella attached to the lid frequently falling with it; calyptrae small, just covering the capsule, mitrate or cucullate, non-plicate; peristome teeth entire, perforated or cribrose.

Key to the Maine species of *Schistidium*

1. Plants restricted to seacoasts; leaves entirely bistratose above, costa in cross-section with guide cells and two stereid bands .... 3. *S. maritimum*
1. Plants of fresh water or dry habitats; leaves unistratose above, bistratose at the margins, or irregularly bistratose in longitudinal streaks; costa in cross-section lacking guide cells .... 2.
    2. Plants usually in dry habitats; leaves hyaline tipped or with hyaline hair points .... 2. *S. apocarpum*
    2. Plants along streams, waterfalls, flood zones or seepy habitats; leaves muticous .... 3.
3. Leaves lanceolate, flat above, margins plane throughout or weakly recurved below, rarely bistratose, costa ending below the apex .... 1. *S. agassizii*
3. Leaves ovate, keeled above, margins generally recurved and bistratose throughout, costa percurrent .... 4.
    4. Leaves smooth on dorsal surface of costa .... 4. *S. rivulare*
    4. Leaves papillose on dorsal surface of costa near the apex .. 2. *S. apocarpum*

1. ***Schistidium agassizii*** Sull. & Lesq. in Sull., Musci Hep. U.S. 104. 1856.

Plants medium sized, blackish-green to dark-green, to 20 mm high. Leaves 2-3 mm long, erect-patent when dry, patent to erect-spreading when wet, lanceolate from a somewhat broader base or oblong-ligulate, rounded or obtuse, muticous; margins entire, plane or slightly recurved below, plane above, unistratose or irregularly bistratose above; somewhat keeled near the costa, otherwise flat in cross-section; costa



Figures 1-8. *Schistidium agassizii*. 1. Perichaetial leaf. 2. Leaf. 3. Peristome tooth, dorsal (outer) surface. 4. Seta, capsule and peristome teeth. 5. Upper leaf cells. 6. Cross-section through median part of leaf. 7. Leaf apex. 8. Basal leaf cells and leaf margin. Scales in mm: top = 0.05 (5-8); subtop = 0.1 (3); subbottom = 0.5 (4); bottom = 0.5 (1,2).

prominent at back, subpercurrent, in cross-section costal cells more or less homogeneous; upper cells 4-12 μm, unistratose, rounded-quadrate to rounded-hexagonal, not sinuose; basal cells (6-)10-26 μm, rectangular, not sinuose; basal cells near costa not differentiated. Autoicous. Setae 1 mm long, straight; capsules 1 mm long, immersed, erect, short-ovoid, flared at mouth when dry; opercula obliquely rostrate; peristome teeth lanceolate, entire, perforated or cribrose, papillose. Spores 12-18 μm. Calyptrae cucullate.

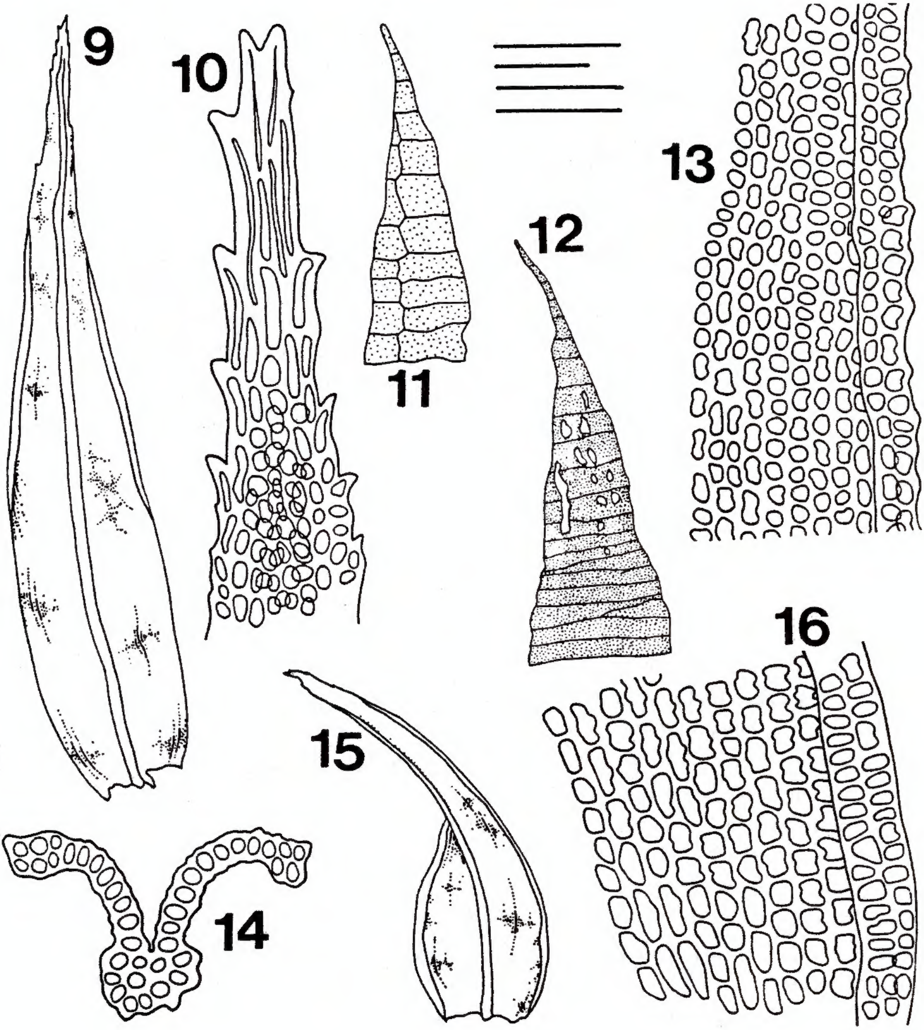
On rocks and boulders in or along stream or river margins, commonly submerged during high water. In Maine known from Androscoggin (*Allen 14735* MO), Cumberland (*Allen 2002*, MO), Oxford (*Allen 10068* MO), Penobscot (*Merrill 29* MO), Piscataquis (*Merrill 30* MO), Somerset (*Allen 9299* MO), and York (*Norton & Whelden* MAINE) counties.

Schistidium agassizii is usually considered rare in eastern North America (Jones 1933, Crum & Anderson 1981). In Maine it appears to be a common, albeit infrequently collected, riparian species. It is recognized by its narrowly lanceolate, obtuse leaves that are plane above and have subpercurrent costae. Although the upper leaf margins can be bistratose the interior cells are unistratose. Hermann (1970) described some collections that had more or less ovate, somewhat keeled upper leaves very much like those of *S. rivulare*. However, even those plants have typical lower leaves as well as broadly obtuse perichaetial leaves and cupulate capsules with widely flaring mouths.

Bremer (1980a) found that while the type of *S. alpicola* was identical to that of *S. agassizii*, the name *S. alpicola* has been erroneously applied to a taxon properly called *S. rivulare*. Consequently most herbarium collections under the name *S. alpicola* actually are *S. rivulare* (or *S. apocarpum*) and not *S. agassizii*.

2. ***Schistidium apocarpum*** (Hedw.) Bruch & Schimp. in B.S.G., Bryol. Eur. 3: 99. 1845.
   Grimmia apocarpa Hedw., Sp. Musc. Frond. 76. 1901.

Plants medium, blackish-green to red-brown, 1.5-2.5 cm high. Leaves 1.5-2 mm long, erect to erect-imbricate when dry, erect-spreading when wet, ovate-lanceolate, ending in short, hyaline, spinulose hair points; margins entire or repand-denticulate above, narrowly recurved throughout, bistratose; keeled in cross-section; costa prominent at back, smooth or coarsely papillose above, in cross-section costal cells more or less homogeneous; upper cells 8-12 μm, at times bistratose, irregularly rounded-quadrate, smooth-walled or sinuose; medium leaf cells 8-14 μm oblong, sinuose, basal cells 12-34 μm, rectangular, smooth-walled; basal cells near costa not differentiated. Autoicous. Setae 0.5 mm long, straight; capsules 1 mm long, immersed, erect, ovoid-ellipsoid, wide-mouthed, smooth or weakly furrowed when dry; opercula obliquely short-rostrate; peristome teeth lanceolate, entire, perforated or cribrose, papillose. Spores 8-14 μm, spherical to oblong. Calyptrae mitrate or cucullate, 0.5 mm.



Figures 9-16. *Schistidium apocarpum*. 9. Perichaetial leaf. 10. Leaf apex. 11. Peristome tooth, ventral (inner) surface. 12. Peristome tooth, dorsal (outer) surface. 13. Median leaf cells and leaf margin. 14. Cross-section through median part of leaf. 15. Leaf. 16. Basal leaf cells and leaf margin. Scales in mm: top = 0.05 (10,13,16); subtop = 0.05 (14); sub-bottom = 0.1 (11,12); bottom = 0.5 (9,15).

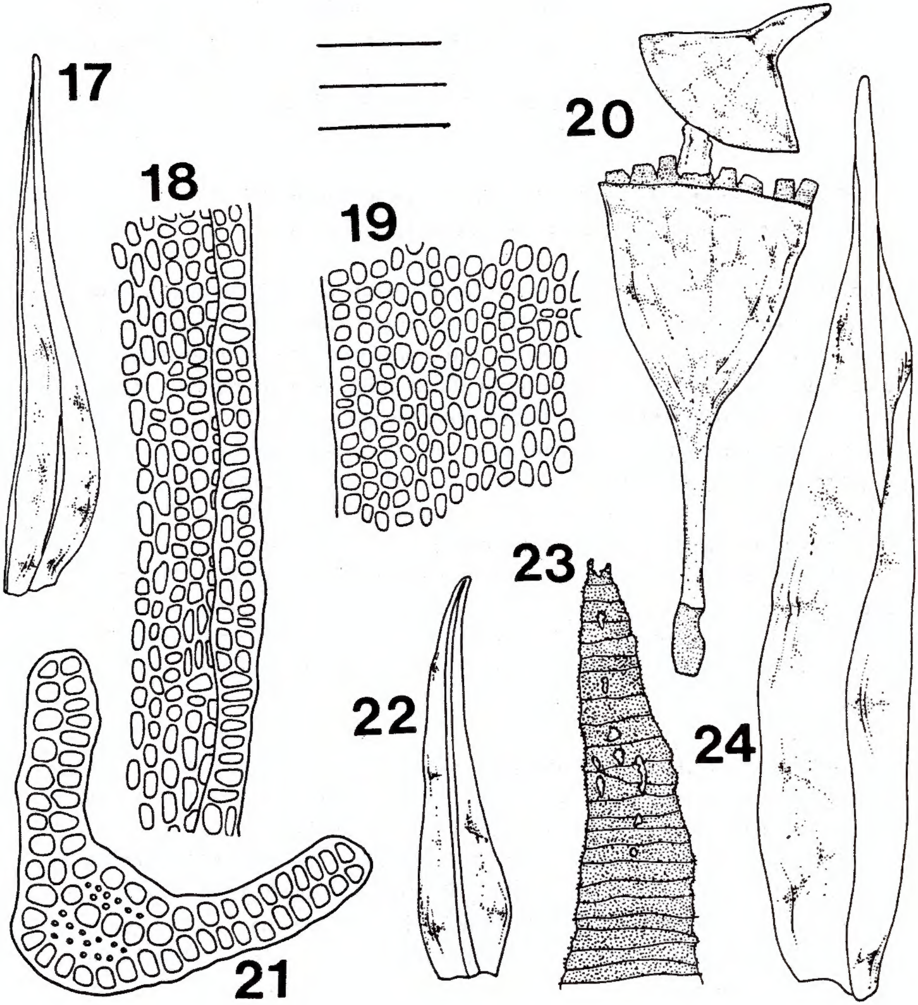
On rocks and boulders usually in mesic to dry habitats, common on stone wall mortar. In Maine known from Androscoggin (*Allen 14661* MO), Aroostook (*Lowe* MAINE), Cumberland (*Norton* MAINE), Franklin (*Allen 10249* MO), Hancock (*Allen 2044* MO), Knox (*Allen 14625* MO), Lincoln (*Allen 234* MO), Oxford (*Parlin 9904* MAINE), Penobscot (*Merrill 29a* MO), Piscataquis (*Merrill 139* MO) Sagadahoc (*Allen 10193* MO), Somerset (*Allen 9307*), and York (*Lowe* MAINE) counties. Reported but not verified from Kennebec (Parlin 1939, Pitman 1928), Waldo (Parlin 1924), and Washington (Spencer 1993) counties.

This is the only Maine *Schistidium* with hyaline-tipped leaves. Hyaline leaf tips are not a constant feature of this species and when they are absent it can be difficult to separate *S. apocarpum* from *S. rivulare*. The two taxa have been considered synonymous (Sayre 1946), but most authors recognize them as distinct species. Epilose collections of *S. apocarpum* differ from *S. rivulare* in having prominent papillae on the upper, dorsal, costal surface, more sinuose leaf cells, and a preference for calcareous substrates. Bremer (1980b) gives a detailed treatment of this variable species.

3. ***Schistidium maritimum*** (Turn.) Bruch & Schimp. in B.S.G., Bryol. Eur. 3: 102. 1845.
Grimmia maritima Turn., Muscol. Hibern. Spic. 23. 1804.

Plants small to medium, blackish-green, 1-2.5 cm high. Leaves 2-3 mm long (inner perichaetial leaves to 4 mm), erect-patent when dry, erect spreading when wet, linear-lanceolate, muticous; margins entire, plane or slightly revolute on one or both sides below, plane above, 2-3 stratose in upper half; concave in cross-section; costa prominent at back, percurrent or excurrent, in cross-section with median row of guide cells, ventral stereids and dorsal stereids; upper cells 6-9 μm, rounded-quadrate, incrassate, not sinuose, bi- or tri-stratose throughout; basal cells 9-16 μm, short-rectangular, walls straight or weakly sinuose, incrassate; basal cells near costa not distinctly differentiated. Autoicous. Setae 0.5-1 mm long, straight; capsules 0.5-1 mm long, immersed, erect, ovoid to hemispheric, wide-mouthed when dry; opercula obliquely rostrate; peristome teeth lanceolate, entire, perforated or cribrose, papillose throughout. Spores 14-36 μm. Calyptrae cucullate, 0.5 mm.

In crevices on bare, acidic rocks and cliffs near ocean, commonly within reach of salt-water spray. In Maine verified from Cumberland (*Lowe* MAINE), Hancock (*Allen 3703* MO), Lincoln (*Allen 10209* MO), and Sagadahoc (*Allen 3690* MO) counties. Reported but not verified from York (Bremer 1980a) and Washington (Spencer 1993) counties.



Figures 17-24. *Schistidium maritimum*. 17 & 22. Leaves. 18. Basal leaf cells and leaf margin. 19. Median leaf cells and leaf margin. 20 Seta, Capsule, peristome teeth, columella, and operculum. 21. Cross-section through upper part of leaf. 23. Peristome tooth, dorsal (outer) surface. 24. Perichaetial leaf. Scales in mm: top = 0.05 (18,19,21); middle = 0.1 (23); bottom = 0.5 (17,20,22,24).

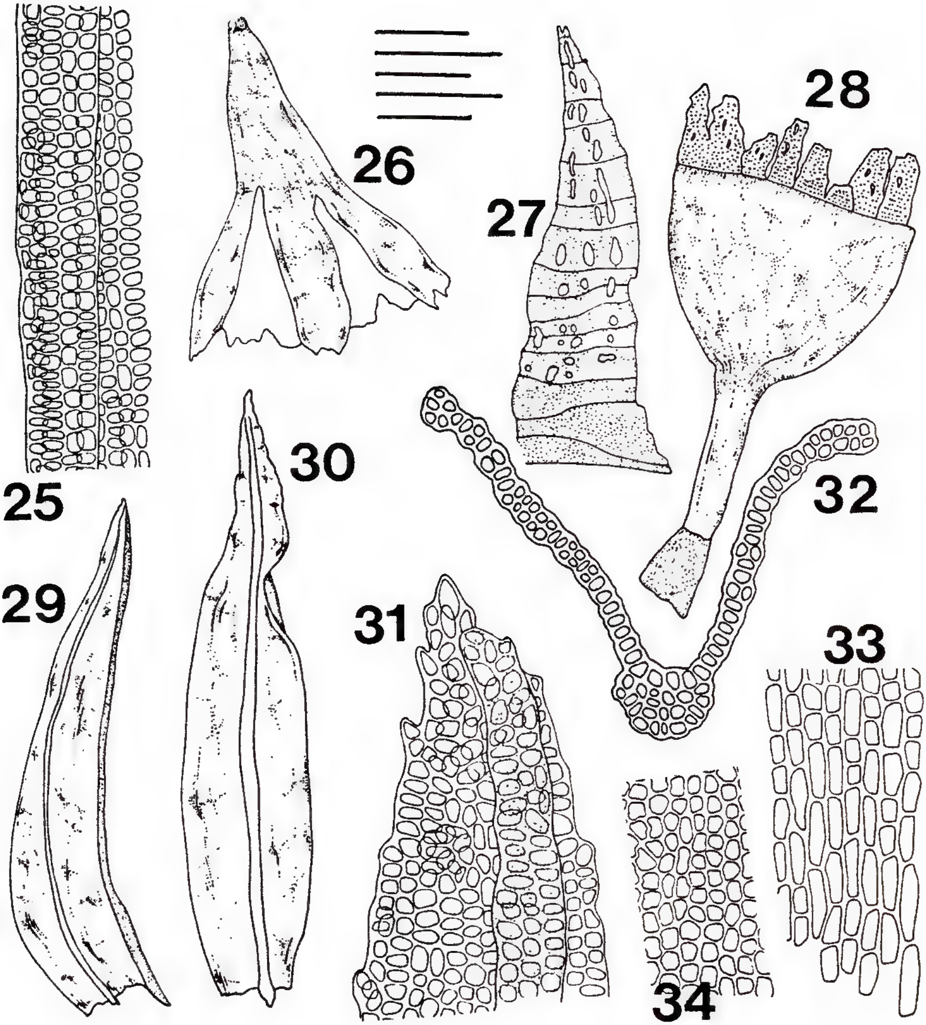
Schistidium maritimum has concave, muticous leaves that are plane margined and entirely 2-3 stratose in the upper half. It is the only species of *Schistidium* with an E-type costa, i.e., with a distinct row of guide cells and both dorsal and ventral stereids. *Schistidium maritimum* is restricted to the seacoast where it grows near enough to the ocean to come into contact with saltwater during rough weather. In Maine *Ulota phyllantha* is commonly associated with *Schistidium maritimum*.

4. ***Schistidium rivulare*** (Brid.) Podp., Beih. Bot. Centralbl. 28: 207. 1911.
Grimmia rivularis Brid., J. Bot. (Schrader) 1(2): 276. 1801.

Plants medium to robust, dark-green to blackish green, 2-5 (-10) cm high. Leaves 1.5-3 mm long (inner perichaetial leaves to 4 mm), erect to loosely imbricate when dry, patent to erect-spreading when wet, ovate to ovate-lanceolate, muticous sometimes ending in short, non-hyaline (rarely hyaline) hair points; margins repand-denticulate or entire above, recurved on both sides to near the apex, generally bi-stratose above; keeled in cross-section; costa prominent at back, in cross-section costal cells more or less homogeneous; upper cells 8-12 μm, occasionally bistratose in streaks, irregularly quadrate to short-rectangular, not sinuose; basal cells 14-26(-46) μm x 10 μm, rectangular to long-rectangular, walls not sinuose, incrassate; basal cells near costa not differentiated, cells in alar region somewhat bulging and decurrent. Autoicous. Setae 0.6-1 mm long, straight; capsules 1-1.5 mm long, immersed, erect, campanulate, wide-mouthed, wrinkled when dry; opercula short-rostrate; peristome teeth lanceolate, entire, perforated, or cribrose, papillose. Spores 14-20 μm calyptrae mitrate, 0.5-1 mm.

On rocks and boulders in or along streams, waterfalls, flood zones or otherwise seepy habitats. Also found on stone walls in areas of high humidity. In Maine known from Androscoggin (*Allen 14744* MO), Aroostook (*Norton* MAINE), Cumberland (*Allen 2000* MO), Franklin (*Allen 10237* MO), Kennebec (*Allen 10409* MO), Lincoln (*Allen 6021* MO), Oxford (*Parlin 14207* MAINE), Penobscot (*Blake* MAINE), Piscataquis (*Lowe* MAINE), Sagadahoc (*Allen 10206* MO), and Washington (*Lowe* Maine) counties. A report (Allen 1993) of the species from York county (= *Racomitrium venustum*) is in error.

Schistidium rivulare is a riparian species often found in association with *S. agassizii*. It differs in having acute, ovate leaves with (usually) recurved upper margins, percurrent costae and acute to acuminate perichaetial leaves. In contrast, *S. agassizii* has obtuse, lanceolate leaves with plane upper margins, costae that end some distance below the apex and broadly obtuse perichaetial leaves. Occasionally the species occurs in mesic habitats where it is difficult to distinguish from muticous collections of *S. apocarpum*. Bremer (1981) separates the two species on spore size (*S. apocarpum* 9-12 μm, *S. rivulare* 14-22 μm), in Maine both species have some spores 14 μm in diameter.



Figures 25-34. *Schistidium rivulare*. 25. Leaf margin at base. 26. Calyptra. 27. Peristome tooth, dorsal (outer) surface. 28. Seta, capsule, peristome teeth. 29. Leaf. 30. Perichaetial leaf. 31. Leaf apex. 32. Cross-section through median part of leaf. 33. Basal leaf cells near costa. 34. Median leaf cells. Scales in mm: top = 0.05 (25,31,33,34); subtop = 0.1 (27,32); middle = 0.02 (26); subbottom = 0.5 (28); bottom = 0.5 (29,30).

Ireland (1982) separates the muticous expression of *S. apocarpum* from *S. rivulare* by the presence in *S. apocarpum* of papillae on the upper, dorsal surface of the costa. This distinction also appears valid for Maine material of the species.

Acknowledgments. I thank the curators of MAINE for the loan of material.

Literature Cited

Allen, B. 1993. Mosses from the State of Maine. - VI. *Evansia* 10: 50-57.

Bremer, B. 1980a. A taxonomic revision of *Schistidium* (Grimmiaceae, Bryophyta) 1. *Lindbergia* 6: 1-16.

_____. 1980b. A taxonomic revision of *Schistidium* (Grimmiaceae, Bryophyta) 2. *Lindbergia* 6: 89-117.

_____. 1981. A taxonomic revision of *Schistidium* (Grimmiaceae, Bryophyta) 3. *Lindbergia* 7: 73-90.

Crum H. A. & L. E. Anderson. 1981. *Mosses of Eastern North America*. Vol. 1. Columbia University Press, New York.

Hermann, F. J. 1970. *Grimmia agassizii*, a moss new to Michigan. *Michigan Botanist* 9: 244.

Ireland, R. R. 1982. *Moss Flora of the Maritime Provinces*. National Museum of Canada, Publications in Botany, No. 8. Ottawa.

Jones, G. N. 1933. Grimmiaceae. *In* A. J. Grout (ed.), *Moss Flora of North America North of Mexico* 2(1): 1-65.

Lorch, W. 1931. *Anatomie der Laubmoose*. Berlin.

Parlin, J. C. 1924. Miscellaneous Notes. *Maine Naturalist* 4: 29-34.

_____. 1939. Some Maine lichens, hepatics and mosses. *Bulletin Josselyn Botanical Society Maine* 7: 30-59.

Pitman, E. M. 1928. A partial list of mosses found in Winthrop, Maine. *Maine Naturalist* 8: 131. 1928.

Sayre, G. 1946. The taxonomic rank of *Grimmia alpicola*. *Bryologist* 49: 3-7.

Spencer, M. R. 1993. A bryophyte checklist of Roque Island, Maine. *Maine Naturalist* 1: 27-32.70.

Tallis, J. H. 1959. Studies in the biology and ecology of *Rhacomitrium lanuginosum* Brid. *Journal of Ecology* 47: 325-350.

A Study of the Hepaticae of Kootenay National Park, British Columbia, Canada

Won S. Hong[1]

The Kootenay National Park is located in southeastern British Columtia, Canada, between the semi-arid Rocky Mountain Trench (Columbia River Valley), and the Continental Divide, and extends from 50°31' - 51°21' N to 115°51' - 116°20' W. The park includes Vermilion Valley and sections of Sinclair ard Kootenay Valleys which are watersheds and source of the Kootenay and Vermilion rivers. The highest elevation in this park is Deltaform Mt. (3425 m), located in the northwestern corner of the park.

The park is mainly composed of sandstones and shales, limestones are also found. In the southern corner of the Park, there are red cliffs due to friction which oxidized the iron in the rocks. Climatically the damp eastery air from the Pacific Ocean predominates in the park, and the north-south tread of the mountains influences the amount of precipitation. The heaviest precipitation occurs on the western slopes; the valleys adjacent to the eastern slopes are much drier.

The flora of the park is distinct due to the difference in soil, climate and altitude. Ecologically, three zones of the twelve bioclimatic zones of British Columbia (Krajina, 1959) occur in this park; namely, Interior Douglas fur zone (modified dry forest zone), Subalpine Engelmann spruce-subalpine fir zore and Alpine zone (alpine tundra vegetation zone). The Interior Douglas fir zone occurs in the Columbia River Valley, and the dominant trees of this zone are Douglas fir (*Psudotsuga menziesii*), western larch (*Larix occidentalis*), western red cedar (*Thuja plicata*) and Douglas maple (*Acer glabrum*). The subalpine Engelmann spruce-subalpine fir zone occurs near the timberline area, and the dominant trees of this zone are alpine fir (*Abies lasiocarpa*), Engelmann spruce (*Picea engelmannii*), Labrador tea (*Ledum groenlandicum*). In some areas of this zone, lodgepole pine (*Pinus contorta*), whitebark pine (*Pinus albicaulis*), limber pine (*Pinus flexilis*) and alpine larch (*Larix lyallii*) also associate as the edaphic climax trees. The alpine zone includes the areas above the timberline (2000-2100 m) found in the Main Ranges of the Rocky Mountain System. In this zone, red mountain heath (*Phyllodoce empetriformis*) and white mountain heath (*Cassiope mertensiana*) occur as climatic climax plants.

Although many collections of vascular plants have been made in the park, especially by A.E. Porsild and K.E. Seel (1965), there have never been any extensive collections and publications regarding the hepaticas of this park. The present paper is prepared primarily on-the basis of the author's collections were made during the summer months of 1968, 1978, 1980, 1983, 1984 and 1985 (over 1000 packets). Specimens from the park borrowed from the herbaria of ALTA, CU and FH, have also been incorporated. In general the nomenclature follow Grolle (1983a, 1983b) and Stotler & Crandall-Stotler (1977). The voucher collection numbers for each taxon are the author's. The site numbers are indicated after each taxon. Figure 1 gives the exact location of collecting sites. Voucher specimens were deposited at the College of Great Falls (GFC), and the available duplicates are in the herbaria of University of Alberta (ALTA), National Herbarium of Canada, National Museum of Natural Sciences (CANM) University of Cincinnati (CINC) and Hiroshima University (HIRO).

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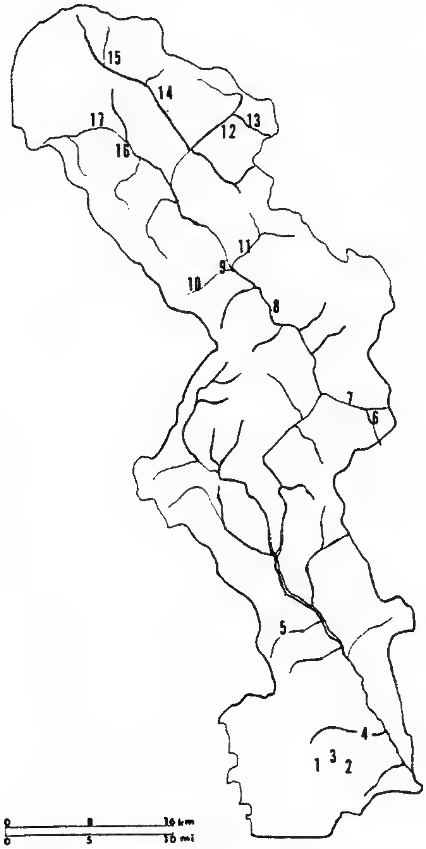

Figure 1. Kootenay National Park, British Columbia, with 17 collecting localities. 1. Sinclair Creek. 2. Redstreak Trail. 3. Compton Creek. 4. Swede Creek. 5. Nixon Creek. 6. Verdant Creek. 7. Simpson Pass Trail. 8. Vermilion Crossing. 9. Vermilion River. 10. Floe Lake Trail. 11. Hawk Creek. 12. Stanley Creek Trail. 13. Foot of Stanley Glacier. 14. Tokumm Creek. 15. Tokumm Creek Trail. 16. Ocher Beds.; 17. Ocher Creek Trail.

Annotated Checklist of the Liverworts

Anastrophyllum hellerianum (Nees) Schust. - shaded decayed wood. 83-105; 1, 2, 4, 6, 7, 9, 10.

Aneura pinguis (L.) Dum. moist streambank. 83-28; 1, 6, 7.

Barbilophozia hatcheri (Evans) Loeske - partially shaded rocks, ledges and on *Peltigera*. 83-118; 2, 7, 8, 9, 11-15.

B. lycopodioides (Wallr.) Loeske - moist shaded ledges and humus. 83-91; 3, 7, 10, 11, 13, 15. The width of cilia at the base of leaves of many collections are 2-3 cells wide and reaching 10 cells in length. Also teeth of perianth of some collections consist of 2-3 cells in contrast to 1-3 cells (Schuster, 1969).

B. kunzeana (Hub.) Gams - shaded moist ledges. 85-183; 16.

B. quadriloba (Lindb.) Loeske - thin soil over rocks. 84-838; 15.

Blepharostoma trichophyllum (L.) Dum. subsp. *trichophyllum* - shaded moist soil, rocks and decayed wood. 80-455; 1 - 11, 13 - 15. Many collections of alpine habitat show intermediate form betweet subsp. *trichophyllum* and subsp. *brevirete*. Especially the cells of upper part of plant bodies are similar to those of subsp. *brevirete*.

B. trichophyllum (L.) Dum. subsp. *brevirete* (Bryhn et Kaal.) Schust. - shaded moist soil and thin soil covered rocks. 83-153; 11, 13, 15.

Calypogeia integristipula Steph. - shaded decayed wood. 83-109; 5, 10, 12, 15.

C. suecica (H. Arnell et J. Perss.) K. Mull. - shaded decayed wood. 80-430; 1, 2.

Cephalozia ambigua Mass. - wet soil. (Hong, 1988).

C. bicuspidata (L.) Dum. - shaded decayed wood. 85-175; 1, 16.

C. lunulifolia (Dum.) Dum. - shaded decayed wood, wet rocks and stream bank. 80-457; 1, 2, 3, 4, 5, 7, 10, 11, 12, 15.

C. macounii (Aust.) Aust. - decayed wood. 85-201; 16.

C. pleniceps (Aust.) Lindb. - swamps and thin soil on rocks. 83-90; 10, 11, 12, 13.

Cephaloziella divaricata (Sm.) Schiffn. - shaded soil. 83-11; 7, 13, 15.

C. rubella (Nees) Warnst. - shaded soil. 80-489; 5, 9.

Chiloscyphus pallescens (Ehrh. ex Hoffm.) Dum. - shaded decayed wood. 80--90; 5.

C. polyanthos (L.) Corda - decayed wood, wet rocks and sandy soil near stream. 68-10; 1, 9.

Geocalyx graveolens (Schrad.) Nees - shaded decayed wood, thinly covered rocks and humus. 80-455; 2, 3.

Gymnomitrion concinnatum (Lightf.) Corda - soil. Hong 1983 (1984).

Jungermannia leiantha Grolle - shaded decayed wood near stream. 80-455; 3

J. sphaerocarpa Hook. - shaded moist soil near stream. 83-50; 6, 7.

Lepidozia reptans (L.) Dum. - shaded decayed wood. 80-456; 1 - 3, 5 - 8, 10.

Lophocolea minor Nees - decayed wood and sandy streambank. 80-425; 1, 2, 14.

Lophozia ascendens (Warnst.) Schust. - moist shaded decayed wood. 83-11; 1, 4, 7, 9. The species was also found in areas of British Columbia, neighboring Alberta and Montana.

L. badensis (Gott.) Schiffn. - soil. 84-858; 15.

L. bantriensis (Hook.) Steph. - wet soil near stream. 85-174; 6, 7, 12, 16, 17.

L. collaris (Nees) Dum. - wet soil near stream. 80-455; 1 - 3, 5 - 13, 15. The number of oil bodies in middle cells of many collections show 10 or more in contrast to 2-5 per cell (Schuster, 1969).

L. excisa (Dicks.) Dum. - rock outcrops. 80-489; 5. The two-celled reddish-brown angular gemmae are distinct.

L. heterocolpos (Thed. ex Hartm.) Howe - wet shaded decayed wood and moist streambank. 83-114; 1, 5, 8 - 10, 13 - 15.

L. incisa (Schrad.) Dum. - shaded decayed wood. 80-468; 1 - 4, 7, 10 - 12, 15.

L. longidens (Lindb.) Macoun - shaded decayed wood. 84-838; 9, 15. Superficially the species is similar to *L. ascendens*, however, the former is easily distinguished by its long exserted perianth.

L. longiflora (Nees) Schiffn. decayed wood and soil. 83-107; 1, 2, 4, 7, 8, 10, 11, 13, 15.

L. opacifolia Culm. ex Meyl. wet soil: 83-82; 11, 15.

L. rutheana (Limpr.) Howe - wet soil near stream. 83-106; 10, 16.

L. suetica (Nees ex Hub.) Grolle - soil. 84-866; 15.

L. vertricosa (Dicks.) Dum. - shaded decayed wood and ledge. 80-463; 1 - 4, 6 - 8, 10, 11, 13.

L. vertricosa (Dicks.) Dum. var. *silvicola* (Buch) Jones - shaded decayed wood. 83-105; 1, 4, 10. The variety was also reported in southwestern British Columbia (Godfrey, 1977) and in northeastern Washington (Hong, 1978).

Marchantia alpestris (Nees) Burgeff. - wet soil. 83-94; 7, 10, 12, 13. All collections show no dark lines in the middle part of thallus.

M. polymorpha L. - wet rocks and moist soil near stream. 80-467; 1 - 3, 8, 9.

Marsupella sparsifolia (Lindb.) Dum. - wet soil. (Hong, 1982).

Pellia endiviifolia (Dicks.) Dum. - wet rocks and soil near stream. 80-470; 2, 3.

P. neesiana (Gott.) Limpr. - moist soil near stream. 85-180; 16.

Plagiochila porelloides (Torrey ex Nees) Lindenb. - wet rocks and soil near stream. 80-455; 1 - 3, 5, 7 - 10, 14, 15. The leaf-margins of most collections are entire as are the collections made from the other areas of British Columbia (Hong, 1979, 1981).

Preissia quadrata (Scop.) Nees - moist soil. 85-215; 16.

Ptilidium pulcherrimum (G. Web.) Hampe - shaded decayed wood. 80-458; 1 - 6, 10, 11, 15.

Riccardia latifrons Lindb. - decayed wood. 83-87; 7, 11, 16.

Scapania curta (Tayl.) Aust. - moist soil. 83-50; 7.

S. glaucocephala (Tayl.) Aust. - shaded decayed wood near stream. 80-490; 2, 5. The 2-celled brownish gemmae are very distinctive. The species is similar to *Anastrophyllum hellerianum* which also occurs in this park. However, the species is distinguished from the latter by its spherical to ovoid gemmae in contrast to vinaceous 1-celled cubical gemmae in *A. hellerianum*.

S. irrigua (Nees) Gott. wet soil. 83-118; 7, 10.

Tritomaria exsectiformis (Breidl.) Loeske - decayed wood. 80-456.; 1 - 3, 6, 7, 10.

T. polita (Nees) Joerg. - moist soil. 85-181; 15, 16.

T. quinquedentata (Huds.) Buch - wet soil. 85-203; 6, 16.

T. scitula (Tayl.) Joerg. - shaded soil. 83-114; 6, 8, 10 - 13, 15

Geographical Relationships. The hepatic flora of Kootenay National Park comprises 16 families, 23 genera, 47 species, 4 subspecies and 4 varieties. These taxa belong to six different distributional elements.

1. Circumpolar, Arctic-Boreal Alpine-Montane -- Twenty three taxa (41.7% of the total) belong to this group. The species which show this distribution pattern inhabit arctic, boreal, alpine and mountain forest regions. The species considered to belong here are: *Barbilophozia hatcheri, B. kunzeana, S. lycopodioies, B. quadriloba, Blepharostoma trichophyllum* subsp. *trichophyllum,* subsp. *brevirete, Cephalozia ambigua, Jungermannia sphaerocarpa, Lophozia bantriensis, L. collaris, L. excisa, L. opacifolia, L. rutheana, L. sudetica, L. ventricosa* var. *silvicola, Marsupella sparsifolia, Scapania curta, S. irrigua, Tritomaria polita, T. quinquedentata* and *T. scitula.*

2. Circumpolar, Boreal Montane -- The following eleven taxa (20.0% of the total) are mainly restricted to boreal forest and mountain forest zones: *Anastrophyllum hellerianum, Calypogeia suecica, Cephalozia macounii, C. pleniceps, Jungermannia leiantha, Lophozia badensis, L. longidens, L. longiflora, Pellia endiviifolia, Scapania glaucocephala* and *Tritomaria exsectiformis.*

3. Circumpolar, Arctic-Temperate Alpine-Montane -- Twelve taxa (22%) are found in arctic, boreal and temperate latitudinal zones and in alpine and mountain forest elevational regions. The following taxs are included: *Aneura pinguis, Cephalozia bicuspidata, C. lunulifolia, Cephaloziella divaricata, Chiloscyphus pallescens, C. polyanthos, Lophozia ventricosa, Marchantia alpestris, M. polymorpha, Pellia neesiana, Plagiochila porelloides* and *Preissia quadrata.*

4. Circumpolar, Boreal-Temperate Montane -- Seven species (12.7%). inhabit boreal, temperate and mountain forest zones. The species considered to belong here are: *Calypogeia integristipula, Cephaloziella rubella, Geocalyx graveolens, Lepidozia reptans, Lophocolea minor, Ptilidium pulcherrimum* and *Riccardia latifrons.*

5. Circumpolar, Arctic Alpine -- One species, *Gymnomitrion concinnatum* (1.8%), is found only in arctic and alpine areas.

6. Circumpolar, Eastern Boreal Montane -- One species, *Lophozia ascendens* (1.8%), is found mainly in boreal zone east of the Rocky Mountains.

Acknowledgement. I thank President W. Shields, Dean T. O'Hare, Chairman R. Bohne and Sister M. Benoit for their assistance. I am also grateful to Dr. P. Benson, Western Region Parks Canada, Calgary, Alberta, and chief park warden of Kootenay National Park, Radium Hot Springs, British Columbia, for the permission to collect; to Drs, R. Ireland (CANM), P. Hyypio (CU), D. Pfister (PH) and D. Vitt (ALTA) for arranging loans.

Literature Cited

Godfrey, J. D. 1977. New and intersting hepatics from British Columbia, Canada and northern Washington state, U.S.A. 1. *The Bryologist* 80: 539-543

Grolle, R. 1983a. Hepatics of Europe including the Azores: an annotated List of species, with synonyms from the recent literature. *Journal of Bryology* 12: 403-459.

_____. 1983b. Nomina generica Hepaticarum; references, types and synonyms. *Acta Botanica Fennica* 121: 1-62.

Hong, W. S. 1978. Hepaticae of Northeastern Washington. *The Bryologist* 81: 586-589.

_________. 1979 (1981). Hepaticae of the Kokanee Glacier Provincial Park, British Columbia, Canada. *Syesis* 13: 9-12.

_________. 1981. Hepaticae of Wells Gray Provincial Park, British Columbia, Canada. *The Bryologist* 84: 414-419.

_________. 1982. The genus *Marsupella* in western North America. *Lindbergia* 8: 166-170.

_________. 1983 (1984). The genus *Gymnomitrion* in North America West of the hundredth Meridian. *Lindbergia* 9: 169-177.

_________. 1988. The Family Cephaloziaceae in North America West of the Hundredth Meridian. *Lindbergia* 14: 79-88.

Krajina, V. J. 1959. Bioclimatic zones in British Columbia. *Univ. of British Columbia Botanical Series* 1: 1-47.

Schuster, R. M. 1969. *The Hepaticaes and Anthocerotae of North America East of the Hundredth Meridian. II.* 1-1062. New York.

Seel, K. E. 1965. *The flora of Kootenay National Park*. Processed publ., 1-20. Kootenay National Park, Radium Hot Springs, British Columbia.

Stotler, R. & B. Crandall-Stotler. 1977. A Checklist of the Liversorts ard Hornworts of North America. *The Bryologist* 80: 405-428.

Five lichens new to Banks Island, Northwest Territories, Canada

William A. Gould [1]

Abstract. *Twenty-nine taxa of macrolichens representing seventeen genera were collected from three localities along the Thomsen River on Banks Island. Five lichen species are newly reported for Banks Island:* Cetraria pinastri, Cladonia alaskana, Peltigera rufescens, Solorina bispora, *and* S. saccata. Cetraria pinastri *and* Cladonia alaskana *have not been reported previously from any of the Arctic Islands.*

Banks Island is located at the southwestern tip of the islands making up the Arctic archipelago. The lichen flora consists primarily of circumpolar arctic and boreal species as well as lichens with more restricted high-arctic and amphi-Beringian distributions. Few lichen collections have been made on the island. Thomson (1990) lists thirty-five macrolichens recorded for Banks Island with additional records of fifty-five microlichens. The twenty-nine species collected in this study include five new records for Banks Island and bring the number of macrolichens recorded to forty species. Specimens in this study were collected in conjunction with a study of the macrolichen floras of three Arctic river valleys in the Northwest Territories of Canada (Gould 1992). Macrolichens were collected at three sites along the Thomsen River (Fig. 1) and vouchers placed in the University of Minnesota herbarium (MIN).

Physiography. The Thomsen River flows northward for 240 km across Banks Island. It is a small, swift-flowing river with its headwaters arising in shallow tundra ponds and lakes. The river flows over gravely deposits of glacial origin and between fairly high hills. Very little bedrock is exposed along the river and there is little variety of lichen substrates. The ridge tops are composed of small stones, sand, and gravel. Soils accumulating in the valleys are characterized as Cryic Regosols (Maxwell 1980). There is a good deal of soil movement due to freezing and thawing along the river valley, and evidence of soil slumping (gelifluction lobes) is common. Patterned ground in the form of low and high centered polygons is also common and these provide microhabitats suitable to a variety of lichen species. The Thomsen River lies within the Victoria Lowlands subregion of the Arctic Lowlands physiographic region (Bostock 1970). The Arctic Lowlands are characterized by flat-lying Paleozoic and late Proterozoic sedimentary rocks. Although the area of Banks Island under study was not glaciated during the most recent ice age, it was at the northwestern edge of the Laurentide ice sheet (Dyke & Prest 1986), and glaciofluvial deposits are extensive.

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Climate. Temperatures recorded on the island range from -52° C to 23° C with the average low and high equaling - 30° C and 8° C. July temperature means range from 2.5° C to about 8° C, while the mean daily temperature in January is about -30° C. The mean frost free period is 15 days, with a maximum recorded 30 day period and a minimum recorded 0 days (Maxwell 1980). Annual precipitation averages 10 cm. Climate records come from the town of Sachs Harbour, a small Inuit community with a population of 145 located on the southwestern side of the island.

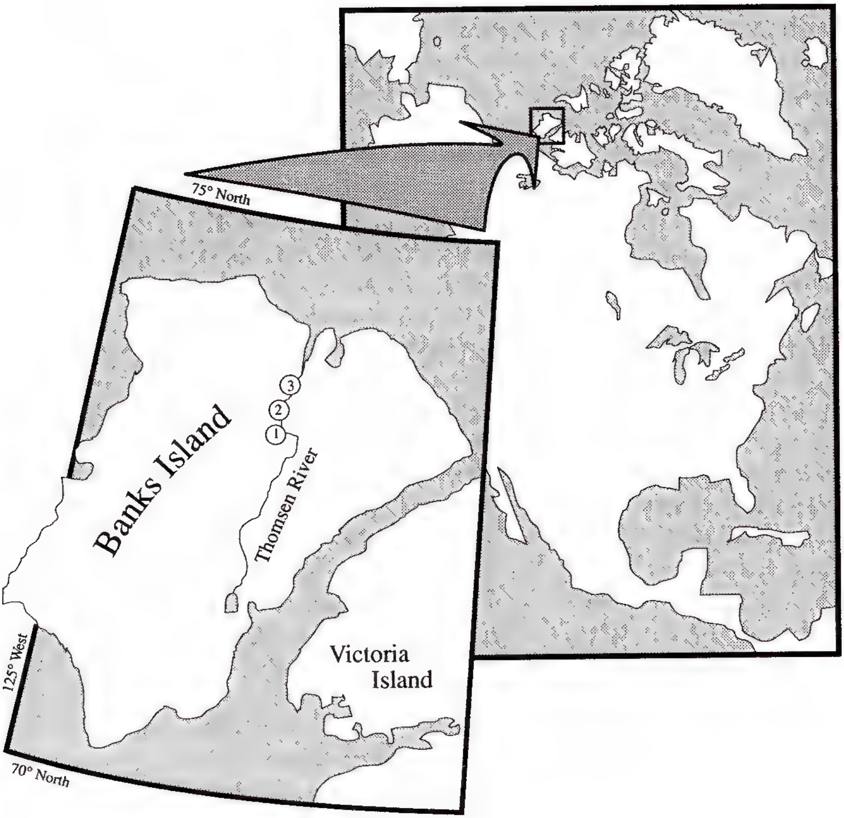

Figure 1. Location of the study area within North America, showing collection areas along the Thomsen River.

Vegetation. Banks Island is characterized as low arctic tundra dominated by low shrubs and graminoid meadows (Ferguson 1984). The vegetation is more lush than that of many of the high arctic islands and consists of Dryas integrifolia, Cassiope tetragona, low growing Salix spp., sedges, various flowering herbaceous plants, mosses, and lichens. Habitat types include bare soil-Dryas habitats on well-drained slopes, and sedge meadows in wetter lowlands and narrow, protected ravines. The Thomsen River valley has been characterized in popular literature as "an arctic oasis" (Lopez 1986) because of the lush sedge meadows along the river, the contrast between these meadows and the surrounding sparse vegetation, and the abundance of wildlife, particularly muskoxen, along the river.

Results and discussion. The majority of the lichens reported here have circumpolar distributions (Thomson 1984). Two species, Cladonia alaskana and Evernia perfragilis, show amphi-Beringian distribution patterns (Thomson 1984).

Localities.

1. 73°28'30" N 119°55' W. 30 m. Along the west side of the river on a well-drained sandy plain typical of the area. Low growing tundra vegetation, 25% bare ground with the remainder primarily Dryas integrifolia with sedges and scattered Salix. No plants over 10 cm.

2. 73°41' N 119°56' W. 22 m. North-facing, 10° slope of well-drained sand and gravel. Poor in organic matter. Mostly bare soil and shards of sedimentary rock.

3. 73°49' N 119°57' W. 54 m. At the confluence of the Muskox and Thomsen Rivers. NE-facing steep slope with level plain below. Tundra, poorly to moderately well-drained with thermokarst and gelifluction activity.

List of Species. Lichens newly recorded for Banks Island are starred (*); substrates are given and numbers indicate localities.

Alectoria nigricans (Ach.) Nyl. On ground among mosses and lichens; 3.
Bryocaulon divergens (Ach.) Karnef. On ground among mosses and lichens; 3.
Cetraria cucullata (Bellardi) Ach. In soil crevices; 1, 3.
C. islandica (L.) Ach. On ground among mosses and lichens; 3.
C. nivalis (L.) Ach. On ground among mosses and lichens; 1, 3.
**C. pinastri* (Scop.) Gray. On ground among mosses; 1.
C. tilesii Ach. On soil; 1.
**Cladonia alaskana* A. Evans. On ground among mosses and lichens; 3.
C. pocillum (Ach.) O. Rich. On bare soil; 1, 3.
C. pyxidata (L.) Hoffm. On ground among mosses and lichens; 3.
Coelocaulon aculeatum (Schreber) Link. On ground among mosses and lichens; 3.
Collema tenax (Swartz) Ach. On soil in rock crevice; 3.

Dactylina arctica (Richardson) Nyl. On ground among mosses and lichens; 3.
D. madreporiformis (Ach.) Tuck. On soil; and in soil crevices; 1, 3.
D. ramulosa (Hook.) Tuck. On ground; 1.
Evernia perfragilis Llano. In soil crevice; 1.
Hypogymnia subobscura (Vainio) Poelt. On rock, soil and bark; 1, 3.
Parmelia omphalodes (L.) Ach. On ground among mosses; 3.
Peltigera aphthosa (L.) Willd. On ground among mosses; 3.
P. canina (L.) Willd. On ground among mosses; 3.
P. didactyla (With.) Laundon. On ground among mosses; 3.
**P. rufescens* (Weis) Humb. On ground among mosses; 3.
Physcia dubia (Hoffm.) Lettau. On rock and Salix; 3.
Physconia muscigena (Ach.) Poelt. On ground among mosses; 1, 3.
**Solorina bispora* Nyl. On ground among mosses; 1, 3.
**S. saccata* (L.) Ach. On ground among mosses; 3.
Stereocaulon alpinum Laurer ex Funck. On bare ground; 3.
Thamnolia subuliformis (Ehrh.) Culb. On ground among mosses; 1, 3.
Xanthoria elegans (Link) Th. Fr. On rock; 1, 2, 3.

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Literature Cited

Bostock, H. S. 1970. Physiographic subdivisions of Canada. In Geology and Economic Minerals of Canada. R. J. W. Douglas (ed.) *Geological Survey of Canada, Economic Geology Report* 1:9-30 and map.
Dyke, A. S. & V. K. Prest. 1986. Late Wisconsinan and Holocene retreat of the Laurentide Ice Sheet. *Geological Survey of Canada*. Map 1702A.
Ferguson, R. S. 1984. *Wildlife Areas of Special Interest to the Department of Renewable Resources*. Wildlife Management, Department of Renewable Resources, GNWT. Yellowknife, Northwest Territories.
Gould, W. A. 1992. *Macrolichens of the Coppermine, Hood and Thomsen Rivers, Northwest Territories, Canada*. Master's Thesis, University of Minnesota, Department of Plant Biology.
Lopez, B. H. 1986. *Arctic Dreams*. Charles Scribner's Sons. New York.
Maxwell, J. B. 1980. *The Climate of the Canadian Arctic Islands and Adjacent Waters*. Vol. 1. Environment Canada. Atmospheric Environment Service.
Thomson, J. W. 1984. *American Arctic Lichens. 1. The Macrolichens.* Columbia University Press. New York.
____________. 1990. Lichens in the Canadian Arctic Islands, pp 385-420. In C. R. Harington (ed.), *Canada's Missing Dimension*. Vol. 1. Canadian Museum of Nature, Ottawa.

***Micromitrium wrightii* in Texas**

William D. Reese[1]

Micromitrium wrightii (C. Müll.) Crosby, described from Cuba, is a very rare moss in North America. In the United States it has hitherto been reported with certainty only from Louisiana (Reese 1968, 1984), although Galloway (1993) reported it as a "provisional record" based on sterile material from Live Oak Co., Texas. I here confirm this species for the Texas bryoflora based on fertile material.

> **TEXAS**. Newton Co. 1 mi. S of the generating station on the Texas side of Toledo Bend Dam; low mixed forest along the outfall channel below the generating station. On soil in low damp bare places in the forest, 19 August 1992, *Reese 18115* (LAF).

In addition to the specimen of *M. wrightii* from Natchitoches Parish, Louisiana, cited in my original report (Reese 1968), I cite below two additional Louisiana collections, from Lafayette Parish. The three specimens from Louisiana and the present report from Texas represent the only firm identifications of this moss in continental North America.

> **LOUISIANA**. Lafayette Parish. Abundant on drying mud in a meander scar; (water stands in this scar for several months of the year); 5 mi. NE of Lafayette, 4 mi. NW of Breaux Bridge, September 1968, *Reese 10439, 10440* (LAF).

Literature Cited

Galloway, C. M. 1993. Moss records for south Texas. *Evansia* 10: 34-40.

Reese, W. D. 1968. New moss records from the southeastern United States. *The Bryologist* 71: 138-139.

_______. 1984. *Mosses of the Gulf South, from the Rio Grande to the Apalachicola.* Baton Rouge and London.

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A Preliminary Report of the Moss Flora of the Northern Shawangunk Mountains of Ulster County, New York

William R. Town, Michael Corey & Marilou Pudiak[1]

The Shawangunk Mountains are a continuation of the Kittatinny Mountains and end about 10 miles south of Kingston, New York. The Northern Shawangunk Mountains stretch from Rosendale to Sam's Point near Ellenville in southeastern Ulster County, New York (Figs. 1, 2 and 3). The rock comprising the Shawangunk Mountains is a sedimentary conglomerate deposited at the edge of an inland sea about 420 million years ago (during the Silurian Period of the Paleozoic Era), reaching a thickness of about 350 feet over Martinsburg Shale (Snyder, 1981).

The Northern Shawangunk Mountains, after periods of uplifting, folding and faulting, reach altitudes to 2289 feet above sea level (at Sam's Point). The area was glaciated several times by ice sheets flowing south down the Hudson Valley -- thicknesses of ice in excess of 4500 feet are believed to have flowed over the Shawangunk Mountains creating the basins which hold the Shawangunk Mountain Lakes (Awosting Lake, Maratanza Lake, Minnewaska Lake, Mohonk Lake and Mud Pond). As the glaciers retreated, the Shawangunk Mountain ridge was probably the first to be exposed, creating a damp and cold climate which provided suitable habitat for plant species more commonly found today farther north (e.g. *Picea rubens* Sarg., *Arenaria groenlandica* (Retz.) Spreng., *Pinus strobus* L., *Tsuga canadensis* (L.) Carr., *Acer saccharum* Marsh and *Fagus grandifolia* Ehrh.). As the glaciers retreated, the climate warmed and dried and southern plant species advanced into the area (e.g.: *Nyssa sylvatica* Marsh. and *Carya* spp. Nutt.). As each species approached its limit of climatic and geologic tolerance, competition with other species became significant thus forcing them to exist in small, scattered populations (e.g.: *Rhododendron maximum* L.).

The average annual temperature at Mohonk Lake is 8.8° C, the average annual precipitation is 118 centimeters and the average annual snowfall is 145 cm. Distribution of precipitation throughout the year is relatively even (an average of 8.4 cm. in January to 11.7 cm. in July). Water pH ranges from 4.0 in Maratanza Lake (in quartz conglomerate) to 6.7 in Mohonk Lake (partially in quartz conglomerate and partially in shale). The climate of the Mohonk Lake area is cooler and drier than Long Island and Cape Cod but is cooler and has wetter summers than the New Jersey Pine Barrens (Kiviat, 1991). Moreover, thick fogs are not an uncommon occurrence along the ridge and in the interior ravines, giving this region humidity levels approaching that of the coastal plain regions which may help explain the presence of

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several coastal plain species (e.g.: *Pinus rigida* Mill., *Corema Conradii* Torr., etc.). Numerous streams and wetlands (permanent and temporary) occur in the Northern Shawangunk Mountains, ranging from those found in slight depressions in the Shawangunk conglomerate to those found deep within some of the ravines where the proximity of the underlying Martinsburg Shale is a significant source of mineral and pH influence. The presence of scattered limestone glacial erratics in the Shawangunk Mountains also has a locally significant impact on soil and water chemistry.

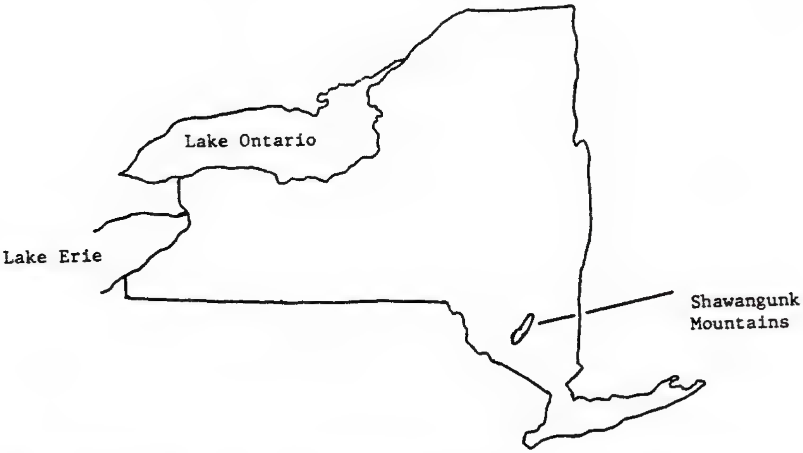

Fig. 1. Outline map of New York State showing location of Shawangunk Mountains.

The combination of climate, glacial geology and mineral and pH influences of soils and rock strata might help account for the great diversity of *Sphagnum* and other moss species found here. To date, a total of 19 wetland sites visited over a five-year period has yielded a total of 37 species of *Sphagnum* of which five species are considered rare in New York State, fourteen species are new records for Ulster County, N.Y. and several are considered coastal plain endemics. Also 37 non-*Sphagnum* mosses of which two are considered rare in New York State and one which is probably a new New York State record have been collected. Of particular interest are the following:

1. *Dicranodontium asperulum* (Mitt.) Broth. Probably a new species for New York State. It is not listed in either the *Revised Checklist of the Mosses of New York State* (Ketchledge, 1980) or the 1988 list of rare mosses of New York State (Clements & Ketchledge, 1988). The Northern Shawangunk Mountains may be the northern limit for this species which is recorded as being found in the mountains of eastern North America as far north as Pennsylvania.

2. *Isopterygium distichaceum* (Mitt.) Jaeg. & Sauerb. This species appears on the 1988 list of rare mosses of New York State (Clements & Ketchledge, 1988) and is noted in Ketchledge's 1980 *Revised Checklist of the Mosses of New York State* as occurring in the northeastern portion of New York State.

3) *Sematophyllum marylandicum* (C.M.) E. G. Britt. A species thae ranges from Nova Scotia south in the mountains to North Carolina on acidic rock. It is listed on the 1988 list of rare mosses of New York State (Clements & Ketchledge, 1988) and has been indicated in Ketchledge's 1980 *Revised Checklist of the Mosses of New York State* as having been located in the Catskill Mountain region.

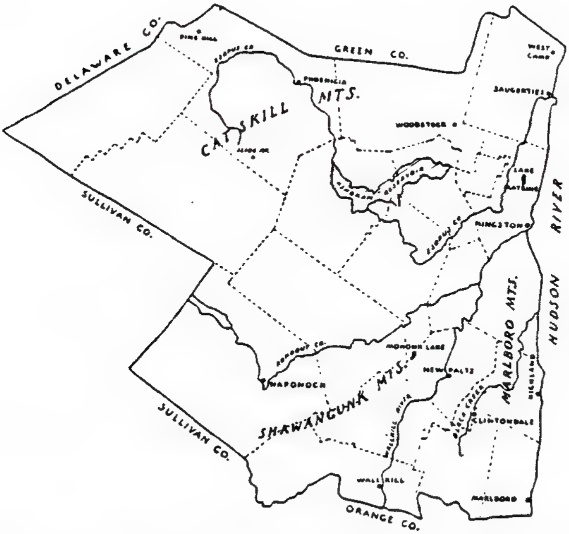

Fig. 2. Map of Ulster County, New York showing location of Shawangunk Mountains.

4. *Sphagnum andersonianum* Andrus. A section *Acutifolia Sphagnum* species listed on the 1988 list of rare mosses of New York State (Clements & Ketchledge, 1988). The Northern Shawangunk Mountain site extends this species southern range limit by several degrees of latitude.

5. *S. angermanicum* Melin. A section *Acutifolia Sphagnum* species which in North America is primarily an oceanic species. This is now the only recorded New York State site for this rare moss (the single Long Island site has been extirpated since 1985).

6. *S. carolinianum* Andrus. A section *Subsecunda Sphagnum* species normally found along the coast in the southeastern United States. The Northern Shawangunk site not only extends its northern range limit but also its coastal limitations.

7. *S. flavicomans* (Card.) Warnst. A section *Acutifolia Sphagnum* species which, in North America, is an Atlantic oceanically distributed species. The Northern Shawangunk sites are some of very few New York State sites off Long Island although it has been reported inland in New Jersey and Pennsylvania.

8. *S. platyphyllum* (Braithw.) Warnst. A section *Subsecunda Sphagnum*. The Northern Shawangunk site is the fifth reported site in New York State for this rare moss of which one site no longer exists. This site represents the southern-most location in New York State (the previous southern New York limit was Knickerbocker Bog in Sullivan County, New York); however, it has been recorded from a single site in Bergen County, New Jersey which is its most southern range limit.

9. *S. trinitense* C. Mull. A section *Cuspidata Sphagnum* which is also a coastal plain species in North America and is listed as a rare moss in New York State. In the Northern Shawangunk Mountains it is found growing at a single lake location at an aquatic depth of about 15 meters on lake sediment. This habitat is very unusual and adds a northern inland range limit as well as a rare latitudinal accurrance. A single site on Long Island and a limited number of locations on Cape Cod are the only other northern sites.

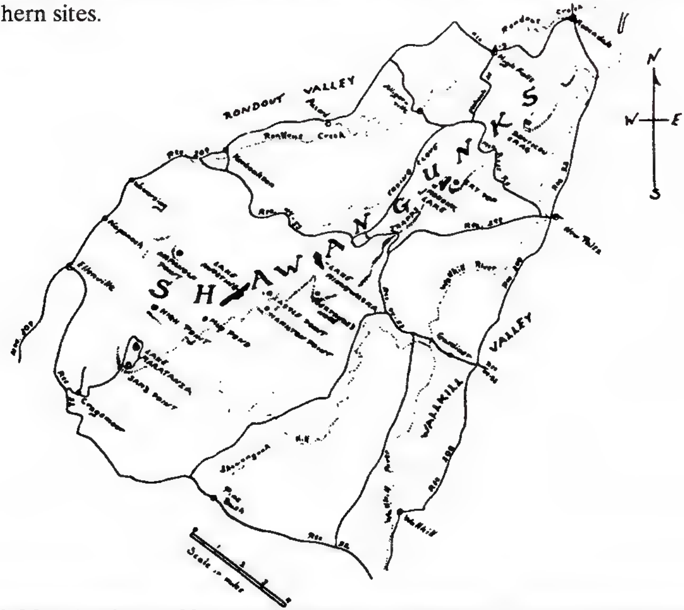

Fig. 3. Map showing the Northern Shawangunk Mountains of Ulster County, New York.

A complete listing of all moss species collected by the authors (alphabetically by genus) is as follows:

Aulacomnium palustre (Hedw.) Schwaegr.
Brotherella recurvans (Mx.) Fl.
Bryhnia novae-angliae (Sull. & Lesq.) Grout
Callicladium haldanianum (Grev.) Crum
Calliergon cordifolium (Hedw.) Kindb.
Climacium americanum
    var. *kindbergii* Ren. & Card.
Dicranella heteromalla (Hedw.) Schimp.
Dicranodontium asperulum (Mitt.) Broth.
D. denudatum (Brid.) Britt ex. Williams
Dicranum flagellare Hedw.
D. fulvum Hook.
D. fuscescens Turn.
D. montanum Hedw.
D. scoparium Hedw.
Drepanocladus fluitans (Hedw.) Warnst.
Eurynchium riparoides (Hedw.) Rich.
Fontinalis dalecarlica BSG
Hygrohypnum ochraceum (Turn.) Loeske
Hypnum imponens Hedw.
H. fertile Sendtn.
Isopterygium distichaceum (Mitt.) Jeag. & Sauerb.
I. elegans (Brid.) Lindb.
Leucobryum glaucum (Hedw.) Angstr.
Mnium cinclidioides Hub.
M. hornum Hedw.
M. punctatum Hedw.
M. punctatum var. *appalachianum* (Kop.) Crum & Anders.
Philonotis fontana
    var. *caespitosa* (Jur.) Schimp.
Plagiothecium laetum BSG
Polytrichum commune Hedw.
P. pallidisetum Funck
Pohlia nutans (Hedw.) Lindb.
Pylaisiella intricata (Hedw.) Grout
Racomitrium aciculare (Hedw.) Brid.
Sematophyllum marylandicum (C.M.) Britt
Sphagnum affine Ren. & Card.
S. andersonianum Andrus
S. angermanicum Melin
S. angustifolium (Russow) C. Jens.
S. bartlettianum Andrus
S. capillifolium (Ehrh.) Hedw.
S. carolinianum Andrus
S. centrale C. Jens.
S. compactum DC
S. cuspidatum Hoffm.
S. fallax (Klinggr.) Klinggr.
S. fimbriatum Wils.
S. flavicomans (Card.) Warnst.
S. flexuosum Dozy & Molk.
S. fuscum (Schimp.) Klinggr.
S. girgensohnii Russow
S. henryense Warnst.
S. isoviitae Flatb.[2]
S. lescurii Sull.
S. magellanicum Brid.
S. palustre L.
S. papillosum Lindb.
S. platyphyllum (Braithw.) Warnst.
S. pulchrum (Braithw.) Warnst.
S. quinquefarium (Braithw.) Warnst.
S. recurvum P. Beauv.
S. rubellum Wils.
S. russowii Warnst.
S. squarrosum Crome
S. subtile (Russow) Warnst.
S. tenellum Brid.
S. tenerum Sull. & Lesq.
S. teres (Schimp.) Angstr.
S. torreyanum Sull.
S. trinitense C. Mull.
S. viridum Flatb.[3]
S. warnstorfii Russow
Tetraphis pellucida Hedw.
Thuidium delicatulum (Hedw.) BSG

[2] (see recent revision of *S. fallax* by K,I. Flatberg)
[3] (see revision of *S. cuspidatum* by K. I. Flatberg)

The documented diversity of moss species found in the Northern Shawangunk Mountains should increase as additional areas are surveyed. The unique geological conditions and glacial history together with the unusual climatic conditions may help explain the diversity of moss species found in this area and may well serve to predict other species which may yet be found there.

Voucher specimens of all *Sphagna* collected in the Northern Shawangunk Mountains are deposited in the following herbaria: State University of New York at Binghamton, Binghamton, New York; Mohonk Preserve Herbarium, Mohonk Lake, New Paltz, New York; and The Paludiological Society , Inc., Clifton Park, New York. *Sphagnum* nomenclature follows Andrus (1980); non-*Sphagnum* moss nomenclature follows Crum & Anderson (1981); and vascular plant nomenclature follows Fernald (1970).

Acknowledgement. The authors wish to thank Dr. Richard E. Andrus (S.U.N.Y. at Binghamton) for help in identifying *Sphagnum* species, for reviewing the initial draft of this paper, and for making helpful suggestions; Mr. Paul C. Huth (Research Director at Mohonk Preserve, Inc.) and Ms. Gail Mihocko (Research Assistant at Mohonk Preserve, Inc.) for guiding and accompanying us to the wetland sites visited in the Northern Shawangunk Mountains, for reviewing the initial draft of this paper, and for making helpful suggestions; and Dr. Lewis E. Anderson (DUKE), Dr. Howard Crum (MICH), Dr. William Buck (NY), Dr. Nancy Slack (Russell Sage College, Troy, NY), and Ms. Lori Leonardi (N.Y. State Museum, Albany, NY) for aiding in the identifications of non-*Sphagnum* mosses.

Literature Cited

Andrus, R. E. 1980. Sphagnaceae of New York State. *New York State Museum Bulletin* 442. 89 pp.

Clements, S. E. & E. H. Ketchledge. 1988. Flora Protection: The Question of Rare Mosses in New York State. *In*: Mitchell, C. J., C. J. Sheviak & D. J. Leopold (eds.). 1990. Ecosystem Management: Rare Species and Significant Habitats. *New York State Museum Bulletin* 471. 314 pp.

Crum, H. A. & L. E. Anderson. 1981. *Mosses of Eastern North America.* Columbia University Press, New York. 2 vols. 1328 pp.

Fernald, M. L. 1970. *Gray's Manual of Botany.* 8th. ed. D. Van Nostrand Co., New York. 1632 pp.

Ketchledge, E. H. 1980. Revised Checklist of the Mosses of New York State. *New York State Museum Bulletin* 440. 19 pp.

Kiviat, E. 1991. *The Northern Shawangunks: An Ecological Survey.* Mohonk Preserve. 106 pp.

Snyder, B. 1981. *The Shawangunk Mountains: A History of Nature and Man.* Mohonk Preserve. 48 pp.

Seventh Annual Blomquist Bryological and Lichenological Foray

Stephen L. Timme[1]

The Seventh Annual Blomquist Foray was held September 25-27, 1992 at the Bear Creek Education Center near Hodges, Alabama. Forty-one people from ten states attended the foray. Deep, moist canyons of sandstone lithology in Franklin, Marion, and Winston counties were visited. At least 87 species of mosses, 23 species of liverworts and one hornwort were collected and identified. Most have been deposited in KSP. The below list represents new county or state (indicated by an asterisk) records collected during the foray. The county in which the species was collected follow the species' author. The following sent a list of their collections to the author: Bill Buck (BB), Storrs Olson (SO), Paul Redfearn, Jr. (PR), Bill Reese (BR), and Stephen Timme (ST).

A checklist was available to the participants and is available upon request by writing the author.

Hornworts

Anthoceros laevis subsp. *carolinianus* (L.) Schust.: Marion (ST)

Liverworts

Asterella tenella (L.) Beauv.: Marion (ST)

Cololejeunea biddlecomiae (Aust.) Evans: Franklin (SO)

Lejeunea laetevirens Nees & Mont.: Winston (ST)

Metzgeria crassipila (Lindb.) Evans: Winston (SO)

Plagiochila asplenioides subsp. *porelloides* (Torrey ex Nees) Schust.: Franklin (ST)

Mosses

Brachythecium plumosum (Hedw.) Schimp.: Winston (BB)

Campylopus tallulensis Sull. & Lesq: Franklin (PR)

Camplyostelium saxicola (Web. & Mohr.) Bruch & Schimp.: Winston (BB, PR, SO)

**Chyrso-hypnum diminutivum* (Hampe) Buck: Winston (SO) Wilkes (1965) reported *Mittenothamnium diminutivum* (Hampe) E.G. Britt. (a synonym of *C. diminutivum*) for Lawrence and Winston counties. Bowers (pers. comm.) found Wilkes' collections to be *Ctenidium molluscum* (Hedw.) Mitt. Olson's collection of *C. diminutivum* was confirmed by Harold Robinson.

Fissidens elegans Brid.: Franklin (BR)

Fissidens microcladus Thwaites & Mitt.: Winston (BR)

Fissidens ravenelii Sull.: Franklin (BB)

Fissidens subbasilaris Hedw.: Franklin (BR)

Fontinalis flaccida Ren. & Card.: Franklin (PR, ST)

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Hookeria acutifolia Hook. & Grev.: Franklin (PR, ST)
Schlotheimia rugifolia (Hook.) Schwaegr.: Franklin (PR); Winston (BB)
Taxiphyllum deplanatum (Bruch & Schimp. *ex* Sull.) Fleisch.: Marion (BB)
Tetradontium brownianum (Dicks.) Schwaegr.: Franklin (PR, SO, ST); Winston (BB)

Acknowledgments. I thank Bill Buck, Storrs Olson, Paul Redfearn, and Bill Reese for submitting results of their collections. Also, thanks go to the management of the Dismals Wonder Garden and Natural Bridge for allowing participants to observe and/or collect bryophytes within their borders. Frank Bower's review of the manuscript and noted several species that had been previously reported. Thanks are extended to my taxonomy students who survived my lectures on bryology and my excitement when observing these organisms. Lastly, to Lewis Anderson, Bill Buck, and Brent Mishler for their assistance, comments, and humor in the field.

Literature Cited

Wilkes, J. C., Jr. 1965. A check list of the mosses of Alabama. *Journ. Alabama Acad. Sci.* 36: 75-93.

Liverwort Identification Workshop

As a part of The New York Natural History Conference III, Norton Miller will conduct a workshop on liverwort taxonomy on April 16, 1994 at the New York State Museum in Albany. The purpose of this workshop is to acquaint beginners and others somewhat familiar with liverwort flora of eastern North America with the basics of field and laboratory identification. The morning will be spent in the field on the Rensselaer Plateau, a mountain area east of the Hudson River near Albany, and the afternoon will be devoted to working on collections in a laboratory using microscopes. Dissecting procedures will be emphasized. Participants are encouraged to bring specimens with them as there will be time to study unknowns as well. Enrollment is limited to 10 participants. The cost is $35.00. Please write or telephone **Dr. Miller at the Biological Survey, New York State Museum, Albany, NY 12230, telephone (518) 486-2010**, to register. The symposia and contributed sessions of the NYNHC III will be held on the 14th and 15th of April at the State Museum in Albany.

Should mosses have common names?
Part 10. The Common Names of Leucodontales

Janice M. Glime[1]

These are mostly large mosses that can often be gathered in large quantities, so many of them have been used as chinking (Lewis 1981; Pant & Tewari 1989). *Fontinalis antipyretica* is named for its use as an insulator against fire around chimneys. *Fontinalis* is usually named for its habitat, including brook moss, fountain moss, water sprite moss, and black river moss. Members of this genus, and other aquatic mosses, are important in the detection of almost every kind of water pollution (Glime and Keen 1984).

Many members of this order have distinctive leaf shapes that are reflected in their common names. *Anomodon* has such names as cattle tongue moss, referring to the leaf shape, but tree apron moss for the same moss refers to its habit of growing in thick mats around tree bases. *Dichelyma* is usually named for its curved leaves, having such names as claw moss, Koshino quill moss (Japan), and curved-sword moss. Neckeraceae, with mostly flattened leaves, is usually named based on that character, with such names as flat moss, flat branch moss, and feather moss. Members of *Neckera, Dendroalsia,* and *Antitrichia* have been used in the western United states to package vegetables because these large mosses were able to retain moisture and keep the vegetables fresh (Grout 1902; Frye 1920).

Although the leaves of *Climacium* are distinctive, its tree-like growth habit is most outstanding, acquiring for it the names of tree moss and palm moss. Because of its tree-like appearance, it is commonly used in Japanese dish gardens to represent tall trees, and it is likewise attractive in Japanese gardens. *Climacium dendroides* has even been used to adorn a lady's hat (Tripp 1888); in other instances, cords to decorate bonnets were made from *Neckera crispa* (Clarke 1902).

Names in the Meteoriaceae usually refer to the pendent habit. These are likewise large mosses, and they have been used in the northwest Himalayas to make bedding and cover the muddy floor because of their abilities to repel insects and resist rot (Pant & Tewari 1989).

Conventions in formatting follow Glime (1989). The **meaning** of the scientific name, as supplied by Elizabeth Dunham, is provided immediately after the scientific name. Any structure to which the name applies is in parentheses. Nomenclature follows Anderson, *et al.* (1990).

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Anomodontaceae

Anomodon Hook. & Tayl.: not law tooth (abnormal peristome)[9]; tree apron mosses[2]; kinuitogoke = silk thread moss[13]; cattle tongue moss[14]; baron moss[25]

Anomodon attenuatus (Hedw.) Hüb.: common tree apron moss[2, 16]; attenuated tail moss[11]; narrow cattle tongue moss[14]; whip baron moss[25]

Anomodon minor (Hedw.) Fürnr.: blunt-leaved anomodon[1, 6]; giboushigoke-modoki = false giboushi (rounded top on post of Japanese bridge)[13]; small cattle tongue moss[14]

Anomodon rostratus (Hedw.) Schimp.: velvet tree apron moss[2, 16]

Anomodon rugelii (C. Müll.) Keissl.: common anomodon[1]; Yezo-ito-goke = thread moss of Yezo[13]; crease-leafed cattle tongue moss[14]; dark baron moss[25]

Anomodon viticulosus (Hedw.) Hook. & Tayl.: tall anomodon[8, 20]; long tail moss[11]; kisuji-kinuitogoke = yellow-striped silk thread moss[13]; large baron moss[25]

Haplohymenium Dozy & Molk.: branching moss[14]

Haplohymenium triste (Ces. in De Not.) Kindb.: rock thread moss[13]; dark-green branching moss[14]

Herpetineuron (C. Müll.) Card.: coiled moss[13]; goat-horn moss[14]

Herpetineuron toccoae (Sull. & Lesq. in Sull.) Card.: coiled moss[13]; goat-horn moss[14]

Pterogonium Sm.: short-branch moss[14]

Pterogonium gracile (Hedw.) Sm.: slender wing moss[8, 11]; common short-branch moss[14]; birdfoot moss[25]

Climaciaceae

Climacium Web. & Mohr: staircase (peristome)[9]; tree mosses[1, 2, 4, 6]; tree moss; longevity moss[14]; tree moss[16]

Climacium americanum Brid.: American tree moss[1]; little-ladder moss[17]

Climacium dendroides (Hedw.) Web. & Mohr: European tree moss[1]; common tree moss[2]; tree moss[3, 5, 10, 11]; tree-like feather moss[8]; everlasting herb[13]; common longevity moss[14]; palm moss[25]

Cryphaeaceae

Cryphaea Web.: thread cedar moss[13]; hidden-capsule moss[14]

Fontinalaceae

Dichelyma Myr.: to halve a covering (calyptra)[9]; water moss[2]; Koshino quill moss[13]; curved-sword moss[14]; claw moss[25]

Dichelyma capillaceum (With.) Myr.: hair claw moss[25]

Dichelyma falcatum (Hedw.) Myr.: claw moss[25]

Fontinalis Hedw.: belonging to water[9]; water mosses[1, 3]; fountain mosses[4]; water moss, brook moss[10]; river moss[13]; water moss[14]; water-sprite moss[25]

Fontinalis antipyretica Hedw.: giant fountain moss[2]; fire-preventer moss[3]; willow moss[7]; greater water moss[8]; incombustible moss[11]; black river moss[13]; common water moss[14]; greater water-moss[20]; large water-sprite moss[25]

Fontinalis dalecarlica Schimp. in B.S.G.: common water moss[1, 3]; narrow water-sprite moss[25]

Fontinalis hypnoides Hartm.: river moss[13]; feather-branched water moss[14]; lake water-sprite moss[25]

Fontinalis hypnoides var. *duriaei* (Schimp.) Husn.: saw-toothed river moss[13]
Fontinalis neomexicana Sull. & Lesq.: New Mexican fountain moss[5]

Hedwigiaceae
Braunia Schimp. in B.S.G.: red-branch moss[14]
Hedwigia P. Beauv.: for Hedwig of Leipzig[9]; hedwigia[1]; Hedwig's mosses[2]; Hedwig's moss[4]; tiger-tail moss[14]
Hedwigia ciliata (Hedw.) P. Beauv.: hedwigia[1]; Hedwig's fringe leaf moss[2, 16]; white-tipped moss[3]; Hedwig's fringe-leaf moss[4]; hoary-branched beardless moss[8, 11]; common tiger-tail moss[14]; cake moss[25]

Leptodontaceae
Forsstroemia Lindb.: bell moss[13]; incomplete-teeth moss[14]
Forsstroemia trichomitria (Hedw.) Lindb.: bell moss[13]; common incomplete-teeth moss[14]
Leptodon smithii (Hedw.) Web. & Mohr: curled wing moss[8]; curly moss[11]

Leucodontaceae
Antitrichia Brid.: opposite hair moss[14]
Antitrichia curtipendula (Hedw.) Brid.: hanging moss[5]; pendulous anomodon[8]; pendulous wing moss[11]; common opposite moss[14]; pendulous wing-moss[20]; fell moss[25]
Dendroalsia abietina (Hook.) Britt.: balsam-tree moss[5]

Meteoriaceae
Barbella Fleisch. in Broth.: beard (peristome)[9]; ito-goke = thread moss[13]; hanging moss[14]
Barbella pendula (Sull.) Fleisch.: thread moss[13]; papillose hanging moss[14]
Papillaria (C. Müll.) C. Müll. in Ångstr.: Usnea-like moss[14]
Zelometeorium patulum (Hedw.) Man.: coarse-trailing moss[14]

Neckeraceae
Homalia (Brid.) Schimp. in B.S.G.: flattened[9]; Yamoto flat moss[13]; flat-branch moss[14]; blunt feather moss[25]
Homalia trichomanoides (Hedw.) Schimp. in B.S.G.: homalia moss[2]; blunt fern-like feather moss[8]; blunt fern feather moss[11]; common flat-branch moss[14]; blunt feather moss[25]
Homaliadelphus Dix. & P. Varde in Dix.: homalia-like moss[14]
Metaneckera menziesii (Hook. in Drumm.) Steere: Menzies' neckera[5]
Neckera Hedw.: for Necker[9]; feather mosses[2]; flat moss[13, 14]; feather moss[25]
Neckera complanata (Hedw.) Hüb.: flat feather moss[7, 8, 25]; flat-leaved neckera[11]; flat-branch flat moss[14]
Neckera douglasii Hook.: Douglas' neckera[5]
Neckera pennata Hedw.: feathered neckera[2, 4, 8, 11]; feather moss[3]; feather flat moss[13]; common flat moss[14]; aspen feather moss[25]
Neckeropsis Reichardt: ribbon moss[13]; neckera-like moss[14]
Neckeropsis undulata (Hedw.) Reich.: common neckera-like moss[14]

Pterobryaceae
Pireella Card.: small-fern moss[14]

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[1] Grout, A. J. 1900. *Mosses with a hand-lens*. Press of Binghampton Republican, New York, 74 Pp.; Grout, A. J. 1903. *Mosses with a handlens and microscope*. By Author. N. Y.

[2] Bland, J. 1971. *Forests of Lilliput*. Prentice-Hall, Inc., Englewood Cliffs. 210 Pp.

[3] Shuttleworth, F. S. and H. S. Zim. 1967. *Non-flowering plants. Ferns, mosses, lichens, mushrooms and other fungi*. A Golden Nature Guide, Golden Press, N.Y. 160 Pp.

[4] Marshall, N. L. 1907. *Mosses and lichens*. Doubleday, Page, & Co., N. Y. 327 Pp.

[5] Harthill, M. P. and I. O'Connor. 1975. *Common mosses of the Pacific coast*. Naturegraph.

[6] Welch, W. H. 1957. *Mosses of Indiana. An illustrated manual*. The Bookwalter Company, Indianapolis. 478 Pp.

[7] Jewell, A. L. 1955. *The observer's book of mosses and liverworts*. Frederick Warne and Co. Ltd., N. Y.

[8] Stark, R. M. 1860. *A popular history of British mosses, 2nd edition*. Routledge, Warne, & Routledge, London (Wheldon & Wesley), 348 Pp.

[9] Dunham, E. M. 1951. *How to know the mosses*. The Mosher Press, Boston.

[10] Crum, H. 1976. *Mosses of the Great Lakes forest, revised edition*. Univ. Mich. 10: 1-404.

[11] Tripp, F. E. 1888. *British mosses, their homes, aspects, structure and uses*. George Bell & Sons, Covent Garden, London (Wheldon & Wesley), 2 Vol.

[13] Dr. Zen Iwatsuki (personal communication)

[14] Jinkun Zhang (personal communication, translated from Wu *et al.* 1984)

[16] Thomas, L. P. and J. R. Jackson. 1985. *Walk softly upon the earth. A pictorial guide to Missouri mosses, liverworts and lichens.* Missouri Department of Conservation, Jefferson City, 129 pp.

[17] Britton, E. G. 1900. Mosses. Nature Study Leaflets, Natural Science Committee of the Associate Alumnae of the Normal College, New York City 4: 1-9.

[20] Russell, T. H. 1910. *Mosses and liverworts. An introduction to their study, with hints as to their collection and preservation*. Sampson Low, Marston & Co., LD. 211 Pp., 10 plates.

[25] Hallinbäck, T. and L. Söderström. 1987. Sveriges mossor och deras svenska namm -- en kommenterad checklista. [The bryophytes of Sweden, an annotated checklist with common names.] Svensk Bot. Tidskr. 81: 357-388.

Literature Cited

Anderson, L. E., Crum, H. A. and Buck, W. R. 1990. List of the mosses of North America North of Mexico. *Bryologist* 93: 448-499.

Clarke, C. H. 1902. Bryological millinery. *Bryologist* 5: 77-78.

Frye, T. C. 1920. Notes on useful and harmful mosses. *Bryologist* 23: 71.

Glime, J. M. 1989. Should mosses have common names? *Evansia* 6(1):1-6.

Glime, J. M. and Keen, R. E. 1984. The importance of bryophytes in a man-centered world. *J. Hattori Bot. Lab* 55: 133-146.

Grout, A. J. 1902. Note. *Bryologist* 5: 78.

Lewis, M. 1981. Human uses of bryophytes I. Use of mosses for chinking log structures in Alaska. *Bryologist*: 571-572.

Pant, G. and Tewari, S. D. 1989. Various human uses of bryophytes in the Kumaun region of Northwest Himalaya. *Bryologist* 92: 120-122.

Tripp, F. 1888. *British mosses. Their homes, aspects, structure, and uses.* George Bell & Sons, Covent Garden, London (Wheldon & Wesley), 2 Vols.

Nineteenth Annual A. LeRoy Andrews Foray

The 19th annual A. LeRoy Andrews Foray will be held at Bear Brook State Park in southern New Hampshire, 16-18 September 1994. Habitats within the park include large pine and hemlock stands, mixed hardwoods, and diverse wetlands including peatlands. Field trips are also planned for the White Mountains of central New Hampshire. For more information contact **Dr. Cyrus B. McQueen, Department of Environmental Sciences, Johnson State College, Johnson, VT 05656. Phone: (802) 635-2356, fax: (802) 635-7615.**

Indices to Poetry and Other Literature with References to Bryophytes and Lichens in The Bryologist Volumes 69-78, 1966-1975

William Dean Reese[1]

Over the ten-year period 1966-1975, poems and passages from varied literary sources were used frequently in The Bryologist as "filler," on pages toward the ends of the issues. The common thread running through the fillers was reference to bryophytes and lichens. Actually, the bryophytes mentioned in the quoted matter are invariably referred to as mosses--liverworts and hornworts apparently either not being perceived as distinct by the quoted authors or lumped under the general name of "moss." The first of this suite of cryptogamic fillers in The Bryologist appeared on pages 138 to 140 in volume 69 and the last appeared on page 111 of volume 78. In all, 79 quoted items representing 67 authors were published in The Bryologist during the ten-year period. The following indices are provided because the filler material is not included in existing indices to The Bryologist.

Before the more or less regular use of filler matter as described above, references to cryptogams in general literature were very rare in The Bryologist. The earliest appears to be an item titled *Hepaticae in Fiction*, by Annie Lorenz [12(4): 63-64. 1909]. Here Lorenz cites a work by Charles Lever, *Harry Lorrequer*, in which Lady Callonby points out a "Jungermania" to guests at an Irish castle. Two somewhat "filler-type" notes on lichens as food for humans, published by O. E. Jennings in later issues of The Bryologist [20(2): 32. 1917; 21(6): 94. 1918], were quoted in part from articles in the Ottawa Naturalist. One of these describes how "*Alectoria jubata* L." was cooked by aborigines in British Columbia, and the other describes "arctic salad," i.e., "the first stomach or rumen of the caribou when it happens to be filled with freshly-chewed reindeer moss or *Cladonia* lichens."

Prior to the 1966-1975 era only two poems were published in The Bryologist, neither specifically attributed to an author. The first is in an article by Alice C. Kendall, *Under the Ferns*, [29(3-4): 46-47. 1926]. Kendall compares the difficulties of beginners (such as herself) in identifying mosses with those experienced by John Ruskin "in the year 1886" when he studied mosses to "know what 'moss' is." Kendall quotes Ruskin at length without, however, revealing the title of his work except that at least part of the material came from Ruskin's *Leaves Motionless*. The second poem to appear in The Bryologist is in an article by Mary C. Van Wert, *The Lure of the*

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Oregon Mosses, [30(5): 89-91]. Van Wert's article describes an ascent of Snowy Mountain, in Linn County, Oregon. [During the ascent the party spent a night sleeping on "great armfuls of *Neckera douglasii*" gathered for the purpose.] The article concludes with seven lines of poetry focusing on the "snowy peaks of Oregon." It seems likely that Van Wert is the author of the poem.

The ten-year run of matter used as filler in The Bryologist, 1966-1975, is indexed below. The first index is arranged alphabetically by the names of the authors of the quoted works. Following the author's name is either the title of the work from which the matter is quoted or a phrase in quotation marks, usually alluding to the subject matter of the quoted piece (and used as short titles for such pieces in The Bryologist). Then follow the volume, (part), and page numbers for the issue of The Bryologist where the quoted work appeared. The second index is alphabetic by the actual and short titles.

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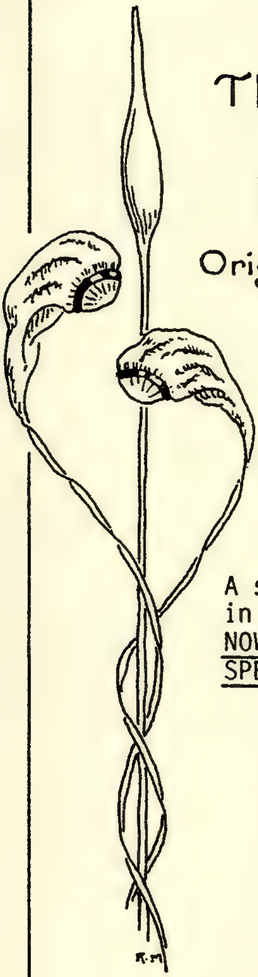

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The Grimmiaceae (Musci) in Maine. III. *Racomitrium*

Bruce Allen[1]

Racomitrium, with six species in Maine, occupies a broad range of habitats. One species (*R. aciculare*) is riparian, often growing submerged in streams. Others occur in mesic or xeric habitats that are seepy during times of rain run-off or snow melt. The most widespread species, *R. heterostichum* var. *sudeticum*, is especially common at low elevations in southern Maine. *Racomitrium fasciculare*, an alpine species, and *R. microcarpon* are restricted to the western and northern parts of the state.

Racomitrium can be recognized by its strongly sinuose leaf cells. *Grimmia* species with sinuose lower leaf cells may be difficult to distinguish from depauperate collections of *Racomitrium*. Examining stem cross-sections indicates that *Racomitrium* lacks a central strand, while nearly all *Grimmia* species have one. Leaf apical form in *Racomitrium* is especially variable. Some species are consistently muticous, others always have hyaline tipped leaves, while still others have both types of leaves. In the latter case both leaf types may occur in single collections or collections may be either entirely hyaline-tipped or muticous.

The *Racomitrium* peristome has a basal membrane and variably 2-3 cleft teeth. In some species the teeth are filiform and rarely united by trabeculae. In others they are weakly cleft and have well developed trabeculae that often hold the divisions together. The peristomes with free, filiform divisions approach those of *Ptychomitrium*, while the weakly cleft teeth are similar to strongly cribrose *Grimmia* peristomes. The peristomal basal membrane in *Racomitrium* is often obscured by a prostome that occasionally exhibits a cell pattern indicative of an exostomal origin (see Fig. 4g). *Racomitrium* has a large, mitrate, basally lobed, non-plicate calyptra. Allen (1993) incorrectly characterized its calyptra as plicate and erroneously placed it in the Ptychomitrioideae. Although peristome and calyptra form are important in assessing generic relationships in the Grimmiaceae, characteristics of these structures do not correlate in *Racomitrium*: peristomal evidence places it between *Coscinodon* and *Ptychomitrium*, while calyptral evidence places it between *Coscinodon* and *Grimmia*.

The setae in *Racomitrium* are always tightly twisted in a species specific direction: either clockwise (*R. aciculare*, *R. heterostichum* var. *sudeticum*, and *R. microcarpon*) or counter-clockwise (*R. lanuginosum*, *R. canescens* and *R. fasciculare*).

A good analysis of *Racomitrium* was given by Noguchi (1974). Frisvoll (1983, 1988) monographed the *R. canescens* and *R. heterostichum* groups. These three publications contain excellent illustrations of the *Racomitrium* species found in Maine.

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Racomitrium Brid.

Medium to robust sized plants often with numerous short branches. Stems without a central strand. Leaves imbricate, erect or erect-patent when dry, mostly lanceolate; margins plane or revolute; muticous or with hyaline hair-points; costa 1/2-2/3 the leaf length to subpercurrent or percurrent, sometimes forked or branched above, in cross-section with somewhat enlarged ventral guide cells and a layer of dorsal substereids; leaf cells strongly sinuose throughout, smooth or papillose to mammillose, the papillae positioned over either the cell lumens or lateral cell walls. Perichaetial leaves not differentiated to somewhat elongated. Dioicous. Setae straight, twisted (clock-wise or counterclock-wise) when dry, smooth or papillose; capsules erect, symmetric, long exserted, stomata few to many in neck; opercula erect-subulate; annulus of 3-4 rows of thick-walled, elliptical cells, tardily deciduous; columella persistent; peristome teeth united at base, divided above into 2-3 linear divisions. Spores lightly papillose. Calyptrae large, mitrate, non-plicate.

Key to the Maine species of *Racomitrium*

1. Leaves ending in papillose hairpoints .... 2.
1. Leaves muticous or ending in toothed hairpoints .... 3.
    2. Hyaline hairpoints conspicuously decurrent, forming a long, inverted V, usually erose-dentate at margins; laminal cells below hairpoints smooth or with blunt papillae over the lateral cell walls .... 5. ***R. lanuginosum***
    2. Hyaline hairpoints not or weakly decurrent, serrulate at margins; laminal cells below hairpoints with stout, projecting papillae over the cell lumens .... 2. ***R. canescens***
3. Leaves oblong-ligulate, obtuse-rounded, dentate at apex, muticous .... 1. ***R. aciculare***
3. Leaves ovate-lanceolate, acuminate, entire (except for awn) at apex, muticous or hyaline hairpointed .... 4.
4. Leaf margins unistratose .... 5.
4. Leaf margins completely or in part bistratose ... 4. ***R. heterostichum* var. *sudeticum***
5. Leaves muticous, long-acuminate; basal marginal cells (except 2-5 cells at extreme base) elongate and sinuose; costa weak, 2/3 the leaf length to subpercurrent .... 3. ***R. fasciculare***
5. Uppermost leaves with hyaline points, acuminate; 8-15 basal marginal cells short-rectangular to quadrate, hyaline and esinuose, forming a border one cell wide; costa strong, percurrent .... 6. ***R. microcarpon***

1. ***Racomitrium aciculare*** (Hedw.) Brid., Muscol. Recent. Suppl. 4: 80. 1819.
Dicranum aciculare Hedw., Sp. Musc. Frond. 135. 1801.

Plants dark-green, yellowish-green or blackish-green, 2-8 cm high. Leaves 2-2.5 mm long, erect-appressed to imbricate when dry, erect-spreading when wet, broadly lanceolate to oblong-ligulate, keeled below, strongly canaliculate at apex near costa, obtuse or rounded, muticous; margins dentate above, entire below, recurved below, plane above, unistratose; costa subpercurrent; upper cells 8-14 µm, rounded-quadrate to rounded-hexagonal, smooth or with low, blunt papillae over the cells lumens; basal cells 30-50 µm, linear, alar cells enlarged, thin-walled. Setae 4-8 mm long, dark red, twisted clock-wise when dry, smooth; capsules 1.5-2.5 mm long, oblong-cylindrical, smooth to slightly furrowed when dry; opercula 1-1.5 mm long; peristome teeth lanceolate, divided nearly to the base into 2-3 linear-subulate divisions, densely papillose. Spores 14-20 µm. Calyptrae 2 mm long, papillose at apex.

On rocks and boulders in or along streams or river margins, occasionally found in seeps on bare coastal rocks just above high tide mark. In Maine known from Androscoggin (*Allen 14715* MO), Cumberland (*Lowe* MAINE), Franklin (*Allen 10310* MO), Hancock *Allen 2048* MO), Knox (*Allen & Allen 6070* MO), Lincoln (*Allen 14567* MO), Oxford (*Parlin 11646* MAINE), Piscataquis (*Lowe* MAINE), Somerset (*Allen 9343* MO), Waldo (*Allen 10376* MO), and Washington (*Pedano 335* MO) counties.

Racomitrium aciculare has broad, muticous leaves that are obtuse to rounded and dentate at the apex. Its leaf cells often have multiple papillae over the cell lumens. Lawton (1972) considered these papillae different from those of *R. fasciculare* which are over the lateral cell walls. Noguchi (1974), however, found both types of papillae in *R. aciculare*. This species is often found submerged in streams, it is the only aquatic *Racomitrium* species in Maine.

2. ***Racomitrium canescens*** (Hedw.) Brid., Muscol. Recent. Suppl 4: 78. 1819.
Trichostomum canescens Hedw., Sp. Musc. Frond. 111. 1801.

Plants yellowish-green to yellow-brown, 3-8 cm high. Leaves 1.5-2.5 mm long, erect to imbricate with flexuose-spreading awns when dry, erect-spreading when wet, lanceolate to ovate-lanceolate, concave below, canaliculate near the costa, keeled above, acuminate, ending in hyaline, serrate to dentate, densely papillose, weakly decurrent hairpoints; margins entire, usually recurved to revolute throughout, unistratose; costa 1/2 to 2/3 the leaf length (occasionally percurrent to subpercurrent), commonly forked or branched above; cells with stout papillae over the cell lumens on both surfaces, upper cells 10-25 µm, subquadrate to short rectangular, basal cells 30-50 µm, linear, alar cells hyaline to yellowish, somewhat inflated, decurrent, forming auricles. Setae 5-25 mm long, dark red, twisted counterclock-wise when dry, smooth; capsules 1.5-2.5 mm long, oblong-cylindrical, smooth to slightly furrowed when dry; opercula to 2 mm long; peristome teeth lanceolate, divided nearly to the base into 2 linear-subulate, densely papillose divisions. Spores 8-10 µm. Calyptrae 2 mm long, papillose in upper half.

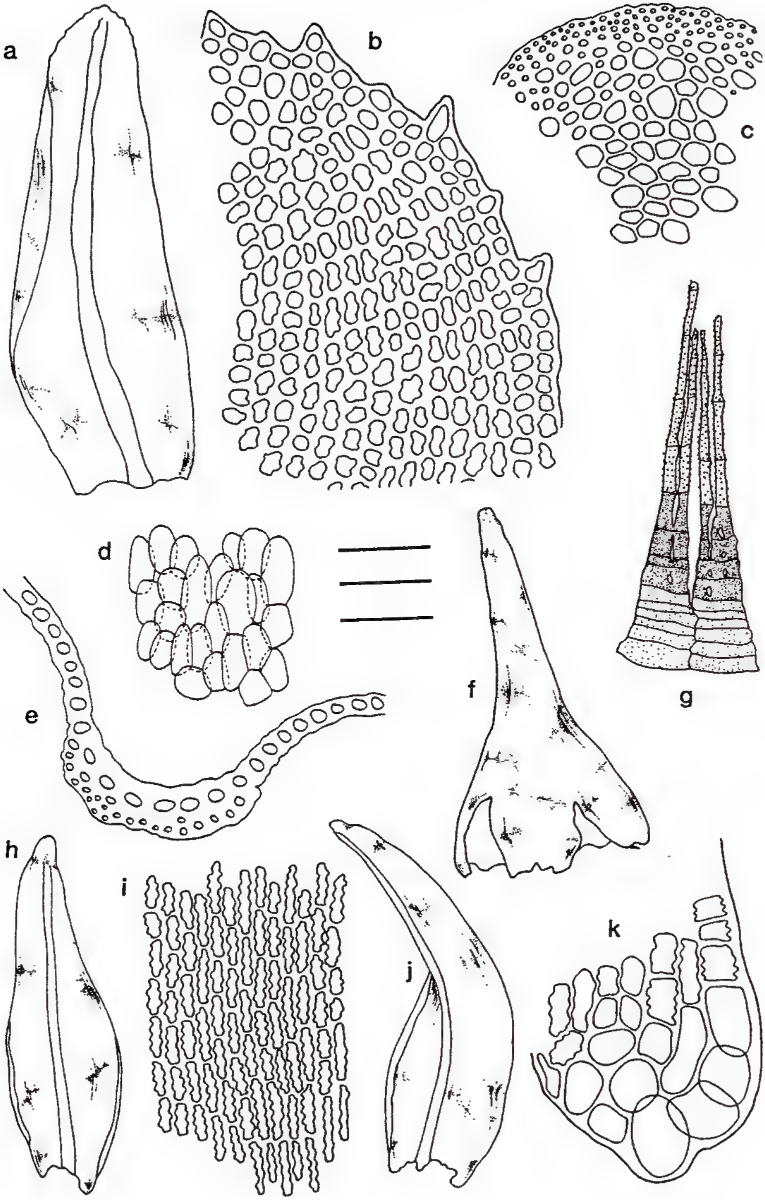
On sandy soil, boulders, and rock ledges along roadsides, in fields, and near streams or waterfalls. It has been reported on limestone or other calcareous rocks (Frisvoll 1983). In Maine known from Franklin (*Lowe* MAINE), Hancock (*Patterson 687e* NY), Oxford (*Norton* MAINE), Penobscot (*Lowe* MAINE), and Piscataquis (*Richards & Cooper 506* MAINE) counties. Reported but not verified from Washington (Spencer 1993) county.

Racomitrium canescens has a yellow-green color, leaves with long, densely papillose, hyaline hairpoints and stout papillae over the leaf cell lumens. *Racomitrium lanuginosum* has similar leaf hairpoints, but they are conspicuously decurrent and erose-dentate at the margins. It also has smooth or weakly papillose leaf cells. The costa in *R. canescens* is commonly 2/3 the leaf length and forked or branched above, but it can also be percurrent to subpercurrent.

3. ***Racomitrium fasciculare*** (Hedw.) Brid., Muscol. Recent. Suppl. 4: 80. 1819.
Trichostomum fasciculare Hedw., Sp. Musc. Frond. 110. 1801.

Plants green, yellowish-green to blackish-green, 2-6 cm high. Leaves 2-3 mm long, erect-patent when dry, erect-spreading to recurved when wet, narrowly ovate-lanceolate, slenderly long-acuminate, concave, acute to rounded at apex, muticous; margins revolute in lower 1/2 to 3/4 on one or both sides, unistratose throughout, entire; costa flat, 3/4 the leaf length to subpercurrent; laminal cells with low papillae or mammillae over the lateral cell walls, upper cells 18-30 µm, long-rectangular; basal cells 30-50 µm, elongate-rectangular, alar cells weakly differentiated, occasionally the extreme 3-4 basal marginal cells enlarged, hyaline, esinuose, rectangular. Monosetous or polysetous; setae 3.5-6 mm long, dark red, twisted counterclock-wise when dry, smooth; capsules 1.5-2 mm long, oblong-cylindrical, smooth when dry; opercula 1-1.2 mm long; peristome teeth lanceolate, divided into 2-3 linear-subulate, papillose to irregularly striate divisions. Spores 16-22 µm. Calyptrae 2 mm long, lobed at base.

Figure 1. *Racomitrium aciculare*. a. Leaf. b. Leaf apex. c. Stem cross-section. d. Annulus cells. e. Cross-section through median part of leaf. f. Calyptra. g. Peristome teeth, dorsal (outer) surface. h. Leaf. i. Lower leaf cells. j. Leaf. k. Leaf alar region. Scales in mm: top = 0.05 (b,d,e,i,k); middle = 0.1 (c,g); bottom = 0.5 (a,f,h,j).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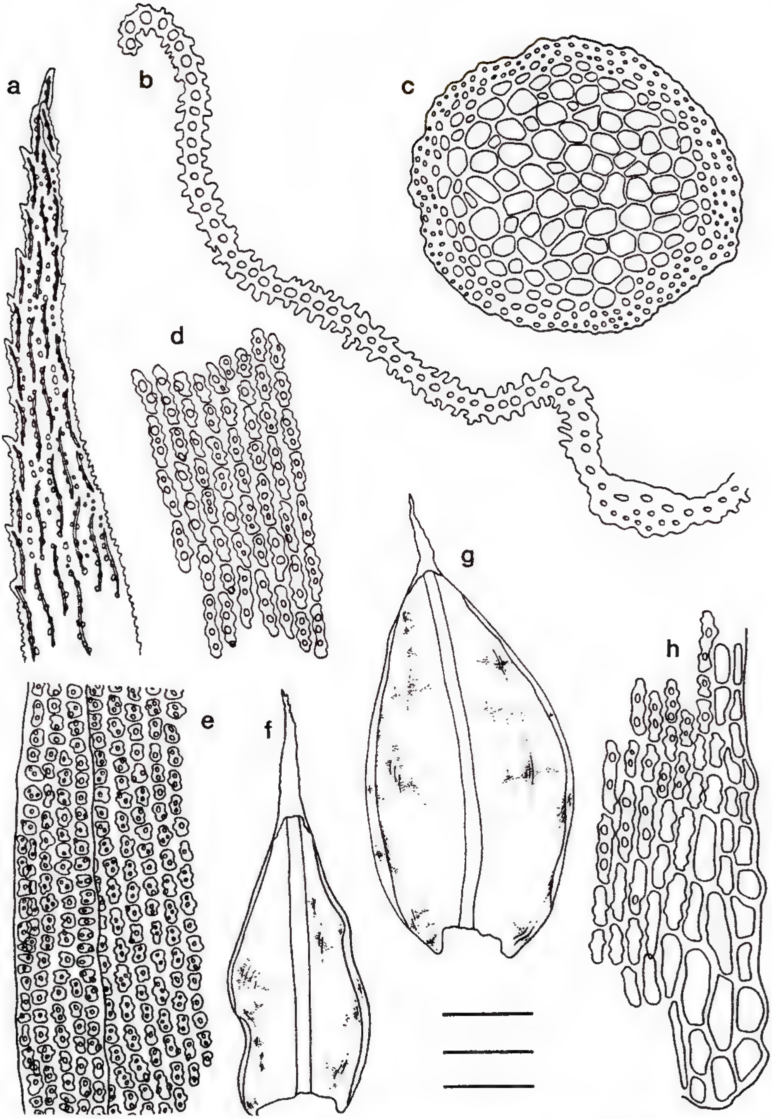


Figure 2. *Racomitrium canescens*. a. Leaf apex. b. Cross-section through median part of leaf. c. Stem cross-section. d. Basal cells. e. Upper leaf cells and leaf margin. f. & g. Leaves. h. Leaf alar region. Scales in mm: top = 0.05 (b,d,e,h); middle = 0.1 (a,c); bottom = 0.5 (f,g).

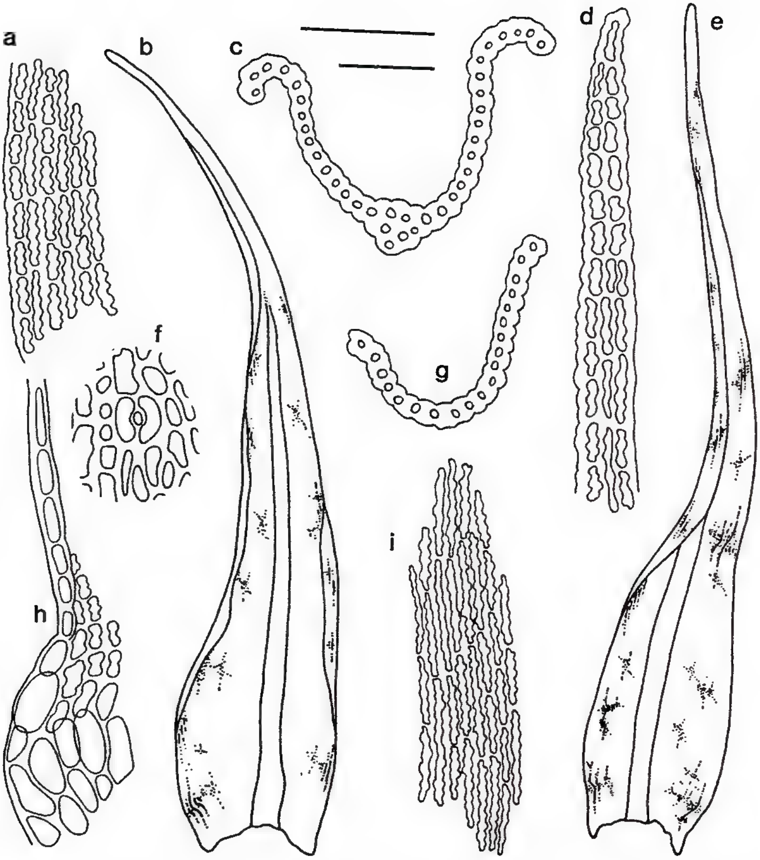


Figure 3. *Racomitrium fasciculare.* a. Median leaf cells and leaf margin. b. Leaf. c. Cross-section through median part of leaf. d. Leaf apex. e. Leaf. f. Stomata. g. Cross-section through upper part of leaf. h. Leaf alar region. i Lower leaf cells. Scales in mm: top = 0.5 (b,e); bottom = 0.05 (a,c,d,f-i).

On rocks, boulders, or ground in open alpine situations and on rock in damp hollow. In Maine known from Franklin (*Richards 5408a* MAINE), Oxford (*Adams 12987* MAINE), and Piscataquis (*Richards & Cooper 511* MAINE) counties.

Racomitrium fasciculare has slender, long-acuminate, muticous leaves, unistratose leaf margins, and short, weak costae. Elongate upper leaf cells are a constant feature of this species that also appear sporadically in other *Racomitrium* species. The basal marginal leaf cells in *R. fasciculare* approach those of *R. microcarpon* and both species have unistratose leaf margins, but *R. macrocarpon* has shorter, broader, hyaline hairpointed leaves. Noguchi (1974) put *R. fasciculare* in section *Papillosa*, along with *R. aciculare*, on the basis of its muticous leaves and leaf cell papillae-type. The species may be closer to *R. lanuginosum*; both species have counterclock-wise twisted setae, similarly shaped leaves, elongate upper leaf cells and the same type of leaf cell papillae.

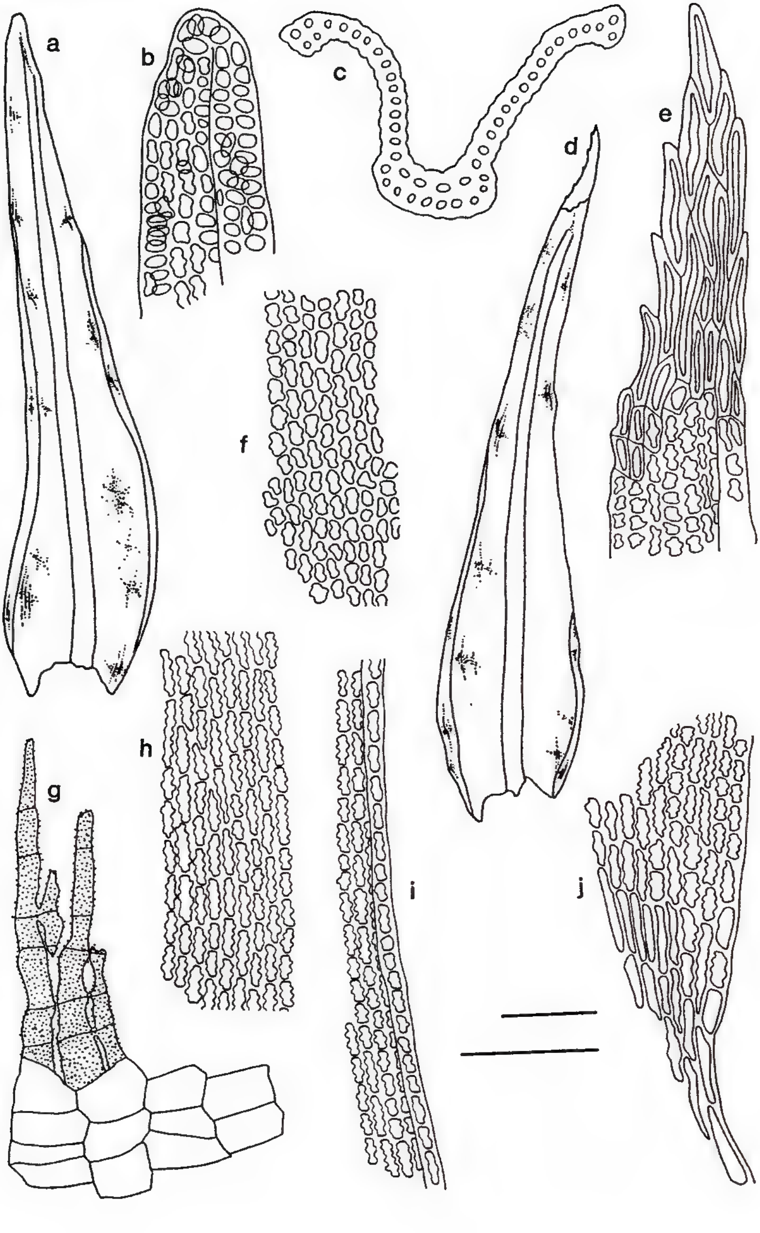
4. ***Racomitrium heterostichum*** (Hedw.) Brid. var. ***sudeticum*** (Funck) Bauer, Musci Eur. Amer. Exsic. ser. 43: n. 2019. 1931.
  Trichostomum sudeticum Funck, Deutschl. Moose 26. 1820. 1(2): 276. 1801.
    Racomitrium sudeticum (Funck) Bruch & Schimp. in B.S.G., Bryol. Eur. 3: 141. 1845.

  ? *Racomitrium venustum* Frisvoll, Gunneria 59: 135. 1988.

Plants green, yellowish-green or blackish-green, 2-6 cm high. Leaves 1.7-2.5 mm long, loosely imbricate when dry, recurved to erect-spreading when wet, ovate-lanceolate to lanceolate, keeled, acuminate or rounded, muticous or narrowed to serrate, hyaline hairpoints; margins revolute from 1/2 to 3/4 leaf length on one or both sides, partly or completely bistratose, entire; costa percurrent; laminal cells smooth, upper cells 6-16 µm, irregularly isodiametric, at times oblate; basal cells 10-24 µm, rectangular, alar cells enlarged, thin-walled, straight-walled. Setae 3-8 mm long, dark red, twisted clock-wise when dry, smooth; capsules 1.5-2 mm long, oblong-cylindrical, smooth when dry; opercula 1 mm long; peristome teeth lanceolate, divided nearly to the base into 2-3 linear divisions often united below by trabeculae, densely papillose. Spores 10-16 µm. Calyptrae 1 mm long, lobed at base.

On rocks and boulders in mesic woodland habitats, exposed ledges and cliff faces in seepy areas, and rocks near streams and lakes, occasionally on rocks near ocean. In Maine known from Androscoggin (*Allen 14733* MO), Franklin (*Adams 13420* MAINE), Hancock (*Allen 3699* MO), Knox (*Allen & Allen 6052A* MO), Lincoln (*Allen 2437* MO), Oxford (*Adams 12965* MAINE), Piscataquis (*Lowe* MAINE), Penobscot (*Blake* MAINE), Sagadahoc (*Lowe* MAINE), Waldo (*Allen 10321* MO), Washington (*Pedano 606* MO), and York (*Allen 13053* MO) counties.

Figure 4. *Racomitrium heterosichum* var. *sudeticum*. a. Leaf. b. Muticous leaf apex. c. Cross-section through median part of leaf. d. Leaf. e. Hairpointed leaf apex. f. Upper leaf cells. g. Peristome tooth, dorsal (outer) surface with prostome at base. h. Basal leaf cells. i. Basal leaf margin. j. Leaf alar region. Scales in mm: top = 0.05 (b,c,e-j); bottom = 0.5 (a,d).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Racomitrium heterostichum var. *sudeticum* is found throughout the state, but it is more common in southern Maine. It has ovate-lanceolate leaves and bistratose leaf margins that are recurved from 1/2 to 3/4 the leaf length on one or both sides. Its leaf apices can be muticous with obtuse, rounded or sharply acute apices or hyaline hair-pointed.

All leaf apical forms can be found on single plants, and although some collections are entirely muticous, most collections have at least some leaves with hyaline hair points at the tips of the branches. Collections with bistratose leaf margins only at the extreme apex can be confused with *R. microcarpon*, but that species has 8-15 short, hyaline, straight-walled cells at the extreme basal leaf margin.

The *R. heterostichum* complex is one of the most variable in the Grimmiaceae (Jones 1933) and most European (Nyholm 1956, Smith 1978) and American (Jones 1933, Crum & Anderson 1981) floras treat it in a broad sense. The complex was monographed by Frisvoll (1988) and much of the Maine material placed here represents *R. venustum* Frisvoll. Frisvoll put *R. venustum* and *R. sudeticum* in different *heterostichum*-subgroups based on the form of their four innermost perichaetial leaves. The situation in Maine regarding this complex is not simple; there are some collections with distinct *sudeticum* or *heterostichum* perichaetial leaf-types, but many collections have an intermediate type. Since most collections of *Racomitrium* lack sporophytes the character is impractical in the absence of other distinguishing features. Frisvoll (1988) provides a detailed list of additional features that separate the two taxa, but in Maine none of these supplementary features are well correlated with each other or with perichaetial leaf type. Especially noteworthy in this regard is the variability encountered in leaf margin stance. Regardless of inner perichaetial leaf form, leaves within single collections may have margins recurved from 1/2 to 3/4 on both sides or leaves plane on one side and variously recurved on the other.

5. ***Racomitrium lanuginosum*** (Hedw.) Brid., Muscol. Recent. Suppl. 4: 79. 1819.
Trichostomum lanuginosum Hedw., Sp. Musc. Frond. 109. 1801.

Plants grayish-green, yellowish-green or blackish-green, sometimes hoary, 3-15 cm high. Leaves 3-5 mm long, erect-appressed to imbricate when dry, erect-spreading when wet, lanceolate to ovate-lanceolate, keeled, acuminate, gradually narrowed to long, hyaline, papillose hairpoints, hairpoints long decurrent, contrasting strongly with the upper laminal cells and forming an inverted V; margins revolute from 1/2 to 2/3 leaf length, unistratose, hairpoints coarsely erose-dentate at base, entire below; costa percurrent; hyaline awn cells densely papillose, laminal cells with low, blunt papillae or mammillae over the lateral walls, or smooth, upper cells 20-50 µm, rectangular to linear; basal cells 40-90 µm, linear, a single marginal row of cells in alar region quadrate to rectangular, thin-walled, nonsinuose. Sporophytes not known in Maine [" ... setae 3-7 mm long, papillose towards the base, twisted to the left [counterclock-wise]; capsule ovoid, about 1.5 mm long, erect, narrowed toward the

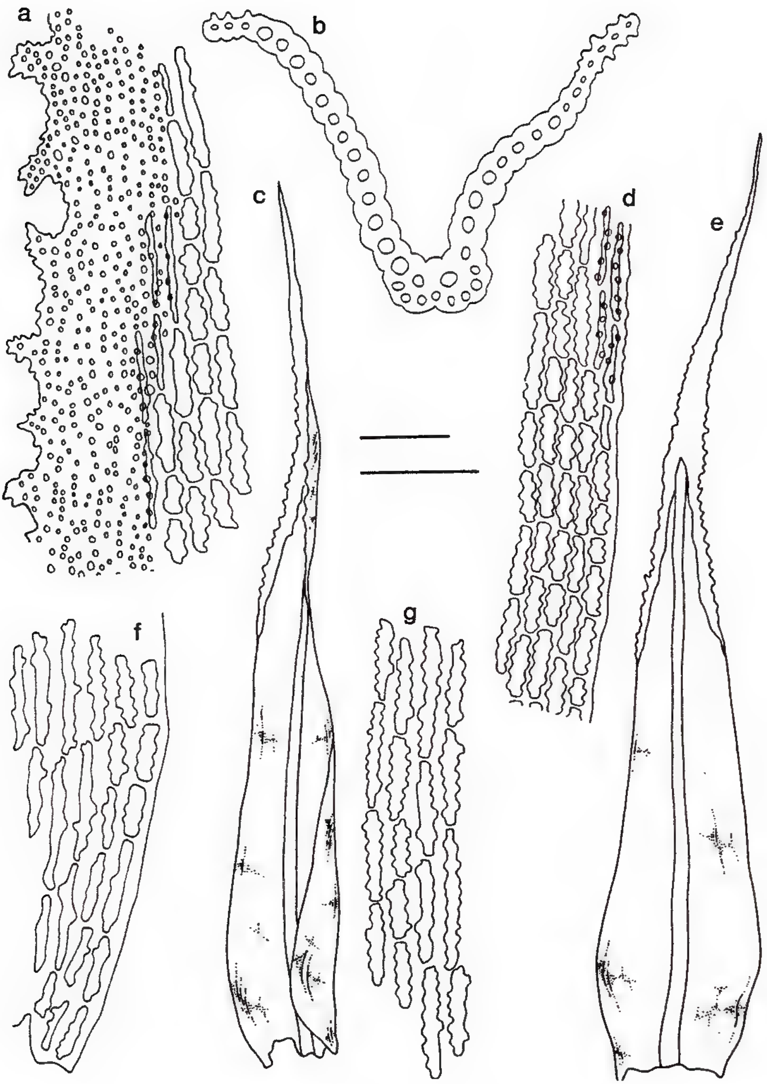

Figure 5. *Racomitrium lanuginosum*. a. Apical leaf margin in region of hairpoint decurrency. b. Cross-section through median part of leaf. c. Leaf. d. Leaf margin below hairpoint. e. Leaf. f. Leaf alar region. g. Median leaf cells. Scales in mm: top = 0.05 (a,b,d,f,g); bottom = 0.5 (c,e).

mouth; calyptra mitrate, papillose at apex; lid long beaked; annulus revoluble, of 3-5 rows of cells; stomata in one row; peristome teeth 0.7-0.9 mm long, very papillose, not swollen at the joints, orange colored, deeply 2-cleft almost to the base; spores yellowish, smooth 8-12 µm, in diameter" (Jones 1933).]

On dry, exposed rocks and boulders or soil in alpine situations. In Maine known from Hancock (*Rand* MAINE, MO) and Piscataquis (*Merrill* MAINE, MO) counties.

Racomitrium lanuginosum leaves have densely papillose, long decurrent hairpoints that are not found in any other Maine *Racomitrium* species. Although papillose, hairpointed leaves occur in *R. canescens* that species has stout papillae over the leaf cell lumens rather than bluntly bulging papillae over the lateral cell walls. *Racomitrium fasciculare*, a species with *lanuginosum*-type papillae, differs in having muticous leaves.

6. ***Racomitrium microcarpon*** (Hedw.) Brid., Muscol. Recent. Suppl 4: 75. 1819.
Trichostomum microcarpon Hedw., Sp. Musc. Frond. 112. 1801, *emend.* Dix., Rev. Bryol. Lichénol. 6: 102. 1933 [1934.]

Plants green, yellowish-green to blackish-green, 2-4 cm high. Leaves 1.5-2.2 mm long, loosely imbricate when dry, recurved to erect-spreading when wet, ovate-lanceolate to lanceolate, keeled, acuminate, narrowed to denticulate, hyaline hairpoints; margins revolute from 1/2 to 3/4 leaf length on one or both sides, unistratose, entire; costa percurrent; laminal cells smooth, upper cells 10-18 µm, short- to long-rectangular, quadrate to oblate at the margins, basal cells 16-40 µm, elongate-rectangular, alar cells somewhat differentiated, the extreme 8-15 basal marginal cells enlarged, hyaline, esinuose (occasionally slightly sinuose), rectangular to quadrate. Setae 2.5-4 mm long, dark red, twisted clock-wise when dry, smooth; capsules 1-2 mm long, oblong-cylindrical; opercula 1 mm long; peristome teeth lanceolate, divided into 2-3 linear-subulate, papillose divisions. Spores 10-16 µm. Calyptrae 1 mm long, lobed at base.

On rocks and boulders, in alpine situations and on rocks in ponds or along streams. In Maine known from Aroostook (*Lowe* MAINE), Franklin (*Richards 5408b* MAINE), Oxford (*Lowe* MAINE), Piscataquis (*Lowe* MAINE, MO), and Somerset (*Allen 9410* MO) counties.

This species is best recognized by its 8-15 enlarged, rectangular to quadrate, hyaline, esinuose leaf cells that line the extreme basal leaf margins (Dixon 1924, Lawton 1972, Frisvoll 1988). Other *Racomitrium* species have similarly differentiated cells, but never to the degree seen here. *Racomitrium microcarpon* resembles *R. heterostichum* var. *sudeticum*, but that species has bistratose leaf margins. Frisvoll (1988) however has reported atypical plants of *R. microcarpon* with some bistratose marginal cells.

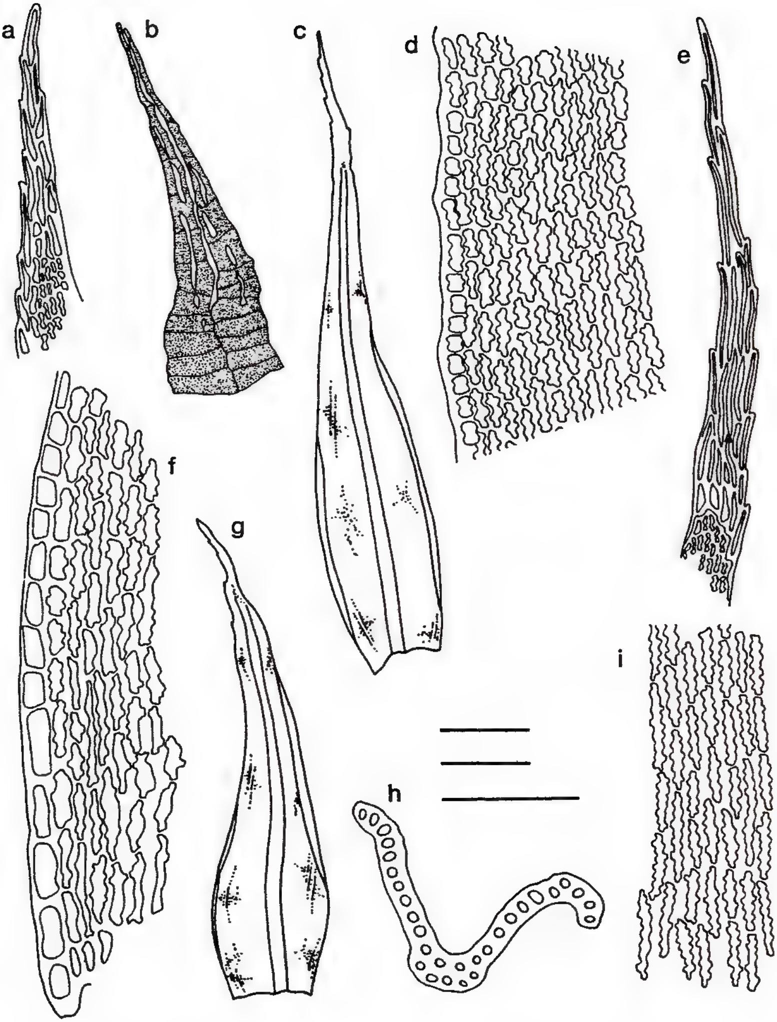

Figure 6. Racomitrium microcarpon. a. Leaf apex. b. Peristome tooth, dorsal (outer) surface. c. Leaf. d. Upper leaf cells and margin. e. Leaf apex. f. Leaf alar region. g. Leaf. h. Cross-section through median part of leaf. i. Basal leaf cells. Scale in mm: top = 0.05 (d,f,h,i); middle = 0.1 (a,b,e); bottom = 0.5 (c,g).

Racomitrium microcarpon appears to be restricted to the northern and western parts of state, while *R. heterostichum* var. *sudeticum* is more commonly encountered in southern Maine.

Acknowledgments. I thank the curators of MAINE and NY for the loan of specimens, Greg Pedano for permission to publish on his collections, and Alan Whittemore and Robert Magill for their views on *Racomitrium*.

Literature Cited

Allen, B. 1993. The Grimmiaceae (Musci) in Maine. I. *Coscinodon* and *Grimmia*. *Evansia* 10: 81-93.

Crum H. A. & L. E. Anderson. 1981. *Mosses of Eastern North America.* Vol. 1. Columbia University Press, New York.

Dixon, H. N. 1924. *The Students Handbook of British Mosses*. Wheldon & Wesley, London.

Frisvoll, A. A. 1983. A taxonomic revision of the *Racomitrium canescens* group (Bryophyta, Grimmiales). *Gunneria* 41: 1-181.

_____. 1988. A taxonomic revision of the *Racomitrium heterostichum* group (Bryophyta, Grimmiales) in N. and C. America, N. Africa, Europe and Asia. *Gunneria* 59: 1-289.

Jones, G. N. 1933. Grimmiaceae. *In* A. J. Grout (ed.), *Moss Flora of North America North of Mexico* 2(1): 1-65.

Lawton, E. 1972. The genus *Rhacomitrium* in America and Japan. *J. Hattori Bot. Lab.* 35: 252-262.

Noguchi, A. 1974. Musci Japonici. X. The genus *Racomitrium*. *J. Hattori. Bot. Lab.* 38: 337-369.

Nyholm, E. 1956. *Illustrated moss flora of Fennoscandia. 2. Musci.* Fasc. 2. pp.85-189. Lund.

Smith, A. J. E. 1978. *The moss flora of Britain and Ireland.* 706 pp. London.

Spencer, M. R. 1993. A bryophyte checklist of Roque Island, Maine. *Maine Naturalist* 1: 27-32.70.

Cladonia metacorallifera Found in New York State

Claire K. Schmitt[1]

Cladonia metacorallifera Asah. has long been known from Japan, South America, Alaska, and western Canada (Thomson, 1984). It was recently reported in New Brunswick, Canada (Gowan and Brodo, 1988). In examining a group of red-fruited *Cladonias* I collected with Evelyn Greene at Wilmington Notch, Essex County, New York, Teuvo Ahti determined that one of the specimens was *Cladonia metacorallifera* Asah., a record for the lower 48 states.

Wilmington Notch (Lat 44° 20'N, Long. 73° 53'W) is a deep valley between the Sentinel Range and Whiteface Mountain of the Adirondack Mountains. It is located on New York Rte. 86 about 9.5 km. south of the town of Wilmington. The West Branch of the Ausable River flows through the valley at an elevation of 500 m., and the adjacent mountains rise to 1183 and 1484 m. The site is composed of talus slope of large boulders, partly wooded and partly exposed, facing northwest. It is a cool spot where the snow lasts late into spring, and ice can sometimes be seen among the boulders. It has long been cherished by botanists for its interesting plants. The 1963 Foray of the American Bryological Society visited the site, and the collections made here are described in Redfearn and Thomson 1965.

Cladonia metacorallifera was collected on the top of a large boulder with a thin layer of humus and mosses in an exposed area. *Cladina rangiferina* (L.) Nyl. and *C. stellaris* (Opiz) Brodo were common at the site, and *C. borealis* Stenroos and *C. pleurota* (Florke) Schaerer were also present. The bedrock of the area is gneiss and presumably the boulders are also. Thomson describes Alaskan habitats for *C. metacorallifera* as "soil rich in humus, often on hummocks in the tundra." Gowan found it "on rocks and mosses over rocks; in deep, open ravines" in Fundy National Park.

Cladonia metacorallifera is a cup-forming, red fruited species. The cups flare gradually, and the edges frequently form an irregular margin. The surface of the podetia is covered with small squamules. Color reactions are K-, KC+, P-. Specimen cited: NEW YORK, ESSEX COUNTY, on exposed, large boulder of cool, northwest- facing talus slope of Wilmington Notch, ca. 700 m., 9.5 km. south of Wilmington on NY Rte. 86; Schmitt 6941, 1 May 1990 (NYS).

Acknowledgments: I am indebted to Teuvo Ahti for identifying the specimen, to Irwin M. Brodo for information about the New Brunswick specimens, and to Carol Reschke for description of the site.

Literature Cited

Gowan, S. P. and I.M. Brodo. 1988. The Lichens of Fundy National Park, New Brunswick, Canada. *The Bryologist* 91: 255-325.

Redfearn, P. L. Jr. and J. W. Thomson. 1965. The 1963 Foray of the American Bryological Society in New York. *The Bryologist* 68: 119-124.

Thomson, J. W. 1984. *American Arctic Lichens 1. The Macrolichens.* Columbia University Press, NY.

[1] Biological Survey, New York State Museum, Albany, NY 12230

Program for the Annual Meeting of ABLS - 1994

MONDAY MORNING, 8 AUGUST

7:30 **ABLS BREAKFAST: U.T. CONFERENCE CENTER, ROOM 1404**

SESS 1 **CONTRIBUTED PAPERS:** The A.J. SHARP Student Papers Session. Joint Session with the Bryological and Lichenological Section, BSA. KENNETH D. McFARLAND, Department of Botany, University of Tennessee, Knoxville, TN 37996-1100 (615/974-2256), presiding.

9:30 KENNETH D. McFARLAND. University of Tennessee, Knoxville. Opening remarks and a tribute to Professor A.J. Sharp.

9:45 DOUGLAS L. BERNHARD* and KAREN S. RENZAGLIA. East Tennessee State University, Johnson City. Origin of centrioles and early development of the locomotory apparatus in the moss *Aulacomnium palustre*.

10:00 DUANE EDWARDS. Southern Illinois University, Carbondale. The bryophyte diaspore bank in the soil of an upland deciduous forest.

10:15 SCOTT LaGRECA* and RYTAS VILGALYS. Duke University, Durham, NC. The systematics of the *Ramalina americana* chemotype complex: a preliminary phylogeny based on rDNA ITS sequence data.

10:30 Recess

10:45 MARIA T. MOYA*, GARY J. BREKON, and FERNANDO J. BIRD. Southern Illinois University, Carbondale and University of Puerto Rico, Mayagüez. Genetic variation in *Marchantia chenopoda* L. in Puerto Rico.

11:00 JAIME G. OAKLEY* and KAREN S. RENZAGLIA. East Tennessee State University, Johnson City. Ultrastructure of the spermatozoid of *Haplomitrium mniodes*.

11:15 STEVEN K. RICE* and PETER H. SCHUEPP. Duke University, Durham, NC and McGill University, Macdonald Campus, Ste-Anne-de-Bellevue, Quebec, Canada. The influence of branch and leaf morphology on boundary layer resistance in *Sphagnum trinitense* and *S. recurvum*.

11:30 ALISON WITHEY. Duke University, Durham, NC. Developing a hypothesis of phylogenetic relationships of the Spiridentaceae (Musci) based on morphological and molecular data.

11:45 KWOK LEUNG YIP. Baylor University, Waco, TX. Ultrastructure of the sporophyte-gametophyte junction in *Ephemerum cohaerens* (Hedw.) Hampe (Musci, Ephemeraceae).

MONDAY AFTERNOON, 8 AUGUST

SESS 2 **SYMPOSIUM:** The Developmental Biology of Bryophytes. Cosponsored by the Bryological and Lichenological Section, BSA. Organized by KAREN S. RENZAGLIA. Department of Biological Sciences, Box 70703, East Tennessee State University, Johnson City, TN 37614 (615/929-6930).

1:30 MARY JANE SAUNDERS. University of South Florida, Tampa. Mosses as model systems to investigate the cell cycle.

2:05 ANGELA J. RUSSELL*, M.R. KNIGHT, T.L. WANG, A.J. TREWAVAS, and K.J. COVE. Leeds University, Leeds and John Innes Institute, Norwich, UK. *Physcomitrella patens*: a model organism for the study of plant development.

2:40 Recess.

3:00 KEVIN C. VAUGHN* and JOHN C. HOFFMAN. USDA/ARS, Stoneville, MS. Developmental changes in cytoskeletal proteins in bryophyte spermatogenous cells.

3:35 ROBERTO LIGRONE* and JEFFREY G. DUCKETT. Dipartimento di Biologia Vegetale, Via Foria, Napoli, Italy, and Queen Mary and Westfield College, London, UK. Cytoplasmic polarity and endoplasmic microtubules in food- conducting cells of bryophytes.

MONDAY EVENING, 8 AUGUST

5:15 **ABLS EXECUTIVE COUNCIL MEETING:**

TUESDAY MORNING, 9 AUGUST

SESS 3 **SYMPOSIUM (Continued from Monday Afternoon):** The Developmental Biology of Bryophytes. Cosponsored by the Bryological and Lichenological Section, BSA. Organized by KAREN S. RENZAGLIA. Department of Biological Sciences, Box 70703, East Tennessee State University, Johnson City, TN 37614 (615/929-6930).

9:00 JEFFREY G. DUCKETT*, ROBERTO LIGRONE, KEITH KINGHAM, and ANDREW R. LEITCH. Queen Mary and Westfield College, London, UK, and Dipartimento di Biologia Vegetale, Via Foria, Napoli, Italy. Differentiation of moss protonemata in relation to diaspore formation, anchorage and solute conduction.

9:35 BARBARA CRANDALL-STOTLER. Southern Illinois University, Carbondale. Developmental constraints, ontogenetic shifts and evolutionary trends in bryophytes.

10:10 DAVID J. GARBARY* and KAREN S. RENZAGLIA. St. Francis Xavier University, Antigonish, Nova Scotia, Canada and East Tennessee State

University, Johnson City. Developmental anatomy and ultrastructure and the phylogeny of bryophytes.

10:45 Recess.

SESS 4 **CONTRIBUTED PAPERS:** Ecology of bryophytes and lichens. Joint session with the Bryological and Lichenological Section, BSA. NANCY SLACK, Biology Department, Russell Sage College, Troy, NY 12180 (518/377-7422), presiding.

11:00 INES SASTRE-D.J. University of Puerto Rico, Mayagüez. Nutrient status of bryophyte communities on coarse woody debris in subtropical wet forests of Puerto Rico.

11:15 CLIFFORD W. SMITH. University of Hawai'i at Manoa, Honolulu. Spray zone saxicolous lichen communities in Hawai'i.

11:30 SUSAN MOYLE STUDLAR* and SUZANNE McALISTER. West Virginia University, Morgantown. Bryophyte communities at Boehler Seeps, Oklahoma.

11:45 SUSAN WILL-WOLF*, BRUCE McCUNE, JON DEY, JERI PECK, and KARIN HEIMAN. University of Wisconsin, Madison and Illinois Wesleyan University, Bloomington. Regional gradients in lichen community composition in southeastern USA.

TUESDAY AFTERNOON, 9 AUGUST

SESS 5 **POSTER SESSION:** The biology of bryophytes and lichens. Joint Session with the Bryological and Lichenological Section, BSA. **KNOXVILLE CONVENTION CENTER, HALL #.**

1:00- Posters will be available for viewing from 1:00 p.m. to 4:30 p.m. Authors will be available to discuss their presentations from 1:00 - 2:00 p.m.

ABLS # MARGARET BASILE*, KEITH ROBERTS, JAN PEART, and DOMINICK BASILE. Lehman College CUNY, Bronx, and John Innes Institute, Norwich, UK. Detection and localization of plant cell surface arabinogalactan proteins by tissue printing.

ABLS # RICHARD D. HYERCZYK. St. Xavier University, Chicago, IL. The lichen flora of the Palos and Sag Valley Forest Preserves.

ABLS # JOHN McMURRAY. University of California, Berkeley. Morphometric comparisons among three species of the moss genus *Thelia* (Leskeaceae).

ABLS # TAKAO NARUI*, CHICITA F. CULBERSON, WILLIAM LOUIS CULBERSON, and SHOJI SHIBATA. Meiji College of Pharmacy, Setagaya-ku, Tokyo, Japan; Duke University, Durham, NC; and Shibata Laboratory of Natural Medicinal Materials, c/o Minophagen Co., Shinjuku-ku, Tokyo, Japan. Phytochemical studies on the Umbilicariaceae (Ascomycotina, Lichens).

ABLS # ROBERT J. THOMAS*, STEVE H. RYDER, MARK I. GARDNER, JONATHAN P. SHEETZ, and STEPHEN D. NICHIPOR. Bates College, Lewiston, ME. Photosynthetic function of moss leaf lamellae.

ABLS # JASON W. WALKER*, TERRY A. HEDDERSON, and RUSSELL L. CHAPMAN. Louisiana State University, Baton Rouge. Phylogenetic relationships among the major moss (Bryopsida) lineages inferred from cladistic analysis of nuclear-encoded rRNA sequences.

2:00 **ABLS BUSINESS MEETING:**

3:15 **BUSINESS MEETING: BRYOLOGICAL AND LICHENOLOGICAL SECTION, BSA.**

TUESDAY EVENING, 9 AUGUST

6:00 **ABLS MIXER:** Jointly with the Bryological and Lichenological Section, BSA. (Cash bar) **HILTON HOTEL.**

WEDNESDAY MORNING, 10 AUGUST

SESS 6 **SYMPOSIUM:** The Fields of Bryology and Lichenolgy: Current Status and Future Opportunities. Cosponsored by the Bryological and Lichenological Section, BSA. Organized by BRENT D. MISHLER, University and Jepson Herbaria, Department of Integrative Biology, University of California, Berkeley, CA 94720 (510/642-2740).

9:00 EFRAIN DE LUNA. Flora de Veracruz, Instituto de Ecología, Xalapa, Veracruz, Mexico. The status of and research opportunities in Latin American bryology.

9:45 PAULA T. DePRIEST. National Museum of Natural History, Smithsonian Institution, Washington, DC. Lichenology: challenges and opportunites.

10:30 Recess.

10:45 DALE H. VITT. Devonian Botanic Garden, University of Alberta, Edmonton, Canada. Applied bryology: possibilities for the future.

11:30 BRENT D. MISHLER. University and Jepson Herbaria, Department of Integrative Biology, University of California, Berkeley. The future of bryology in North America. (Introduction of the speaker by BARBARA M. THIERS.)

WEDNESDAY AFTERNOON, 10 AUGUST

SESS 7 **CONTRIBUTED PAPERS:** Floristics and systematics of bryophytes and lichens. Joint session with the Bryological and Lichenological Section, BSA. LEWIS E. ANDERSON, Department of Botany, Duke University, Durham NC 27708-0338 (919/684-2608), presiding.

1:15 FRANK D. BOWERS. University of Wisconsin-Stevens Point, Stevens Point. Bryophytes of the Apostle Islands National Lakeshore.

1:30 PAUL G. DAVISON* and DAVID K. SMITH. University of North Alabama, Florence and University of Tennessee, Knoxville. Additions to the hepatic flora of the Aleutian Islands, Alaska.

1:45 JOHN J. ENGEL* and GARY L. SMITH MERRILL. Field Museum of Natural History, Chicago, IL. Studies of the Australasian species of *Telaranea* (Lepidoziaceae, Hepaticae).

2:00 GARY L. SMITH MERRILL. Field Museum of Natural History, Chicago, IL. An overview of the genus *Atrichum* in North America.

2:15 RICHARD W. SPJUT. World Botanical Associates, Laurel, MD. What is a species of *Niebla* (Ramalinaceae)?

2:30 RAYMOND STOTLER. Southern Illinois University, Carbondale. Richard Spruce: a sampler of hepatic taxa that he collected and wrote upon.

2:45 Recess

SESS 8 **CONTRIBUTED PAPERS:** Experimental and evolutionary bryology and lichenology. Joint session with the Bryological and Lichenological Section, BSA. MARGARET R. BASILE, Department of Biological Sciences, Lehman College-CUNY, Bronx, NY 10468 (718/960-8800), presiding.

3:00 SHARON E. BARTHOLOMEW-BEGAN. West Chester University, West Chester, PA. Culture-induced phenovariations in sporelings of the Metzgeriidae (Hepatophyta).

3:15 DAVID J. GARBARY* and KAREN A. MacDONALD. St. Francis Xavier University, Antigonish, Nova Scotia, Canada. The brown seaweed *Ascophyllum nodosum* is a lichen.

3:30 JAMES D. LAWREY. George Mason University, Fairfax, VA. Chemical ecology of hypocrealean lichen parasites.

3:45 LESLIE LEVERONE* and VALERIE C. PENCE. Xavier University, Cincinnati, OH, and Center for Reproduction of Endangered Wildlife, Cincinnati Zoo and Botanical Garden, Cincinnati, OH. Cryopreservation as a tool for germplasm preservation in bryophytes and pteriodphytes.

4:00 CONSTANCE S. STUBBS. University of Maine, Orono. Lichen morphology, insect morphology, and insect behavior affect insect-mediated dispersal of sorediate lichens.

4:15 DALE H. VITT. Devonian Botanic Garden, University of Alberta, Edmonton, Canada. *Calomnion*: diversification and specialization on South Pacific islands.

4:30 LEE W. WILCOX*, LINDA E. GRAHAM, and MADELINE M. FISHER. University of Wisconsin, Madison. Hexose transport genes and proteins in charophycean algae and bryophytes: evolutionary and ecological significance.

Distinguished Paper Awards

The Society has established two awards to recognize papers published in *The Bryologist,* **The William Starling Sullivant Award** to recognize a distinguished contribution in bryology and **The Edward Tuckerman Award** to recognize a distinguished contribution to lichenology. Competition for the awards will begin with Volume 97, with the first awards being presented at the 1995 meeting of the Society. All papers published in *The Bryologist* are eligible for nomination by any member of the Society. Nominations should enumerate the merits of the paper, and must be received by the Editor of *The Bryologist* by March 1, 1995. Papers will be judged by an Awards Committee, consisting of the three past Presidents of the Society and the Editor of *The Bryologist,* who will serve as Committee Chair.

Inventory Reduction Sale

The Society is offering a limited number of sets (90-96% complete) of *The Bryologist* for the special sale price of $75.00 per set, including postage. Priority will be given to ABLS members, on a first come, first serve basis. Only one set per person, please. To order, send your request with a check or money order, payable to ABLS, to Dr. Jerry Snider, Business Manager - ABLS, Department of Biological Sciences, University of Cincinnati, Cincinnati, OH 45221-0006.

The Lichens of Thunder Bay District Ontario, Canada

Joan Crowe[1]

Abstract. *440 taxa of lichens are reported from Thunder Bay District. These are substantiated by voucher specimens in herbaria in Canada and the United States. Thunder Bay District is an administrative area of Northwestern Ontario situated to the north and west of Lake Superior. The wide variety of geological formations, forest types and microclimates provides a range of habitats for lichens.*

Thunder Bay district is an administrative section of Northwestern Ontario which has an area of approximately 110 000 km². It extends from the Albany River in the north to Lake Superior in the south and from Pukaskwa National Park in the east to the boundary of Quetico Provincial Park in the west (48° — 51° N and 85° — 91° W). It includes the whole of Lake Nipigon. Only the southernmost part is accessible by road. The Canadian National Railway runs north of Lake Nipigon, and beyond this there is almost no road access.

Although this is a political region it does have some biological integrity, as it is —in effect— the western half of the Lake Superior drainage basin; only the very north and west lies beyond the Arctic watershed. The area was completely glaciated during the Pleistocene (Zoltai, 1961,1965,1967) and is still extremely moist with lakes, rivers and swamps throughout. Precipitation is nothigh, ranging from 700 to 900 mm annually (Sims et al, 1989): approximately one third of this falls as snow. Most of the region lies within the Boreal Forest zone except for a small portion of Great Lakes-St.Lawrence Forest in the southwest (Rowe, 1972).

However, within this broad classification, thirty eight different forest types have been recently listed (Sims et al, 1989). Climate also varies within the region, being modified in the south by Lake Superior, as well as by decreasing latitude (Chapman & Thomas, 1968). For example, the City of Thunder Bay on Lake Superior has a mean annual temperature of +2.3°C and 104 frost free days, Manitouwadge to the east and further north has a mean temperature of +1.1°C and 92 frost free days whereas Armstrong, on the C.N.Railway northwest of L. Nipigon, has a mean of -1.1°C and only 49 frost free days (Sims et al, 1989). Within the general climatic zones, the rugged topography creates microclimates which can vary from temperate to arctic. Arctic-alpine species are known to exist along the shore of Lake Superior as well as in canyons such as Ouimet and Cavern Lake (Given & Soper, 1981). Temperate species such as Sugar Maple and Poison Ivy occur in sheltered areas on the slopes of uplands near Thunder Bay city. In the south, the geology also differs from the predominantly Archean bedrocks of the true Boreal zone. Much of the area is overlain by basic Animikie shales formed in an inland sea about 1.7 to 2.1 billion years ago. This, in turn has been covered by Keeweenawan volcanic rocks which are also basic. It is thought that these outpourings of lava caused the development of the Lake Superior basin which collapsed as magma was drawn from below. If there were ever any palaeozoic rocks they have disappeared, but post-glacial deposits are to be found over much of the area (Pye 1968,1969). The diabase capping the sediments resisted glacial and subsequent erosion, so that there are elevations up to 550m along the north shore of Lake Superior including the highest cliffs in Ontario (lake level approx. 200m). Thus there exists a wide variety of habitat suitable for lichens.

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[1] Claude Garton Herbarium, Lakehead University, 955 Oliver Rd, Thunder Bay, Ontario, Canada P7B 5E1

Expert lichenologists comment on the number of oceanic species which are present (personal communication I. Brodo and L. Tibell). Unfortunately, the area as a whole has not been thoroughly investigated, although the parts adjacent to the city of Thunder Bay have been well covered by Garton and Barclay-Estrup with respect to foliose and fruticose lichens. The crustose lichens have been collected systematically only by Wetmore on the Slate Islands. Many species reported by him are now being found elsewhere, especially in rocky areas along the Lake Superior shore. A number of other eminent lichenologists have visited for short periods of time, collecting mostly close to Lake Superior.

Thus, taxa may have been recorded only once but it does not mean, necessarily, that they are rare in the area. The writer has recently collected two species, *Psorula rufonigra* (Tuck.) G. Schneider and *Spilonema paradoxum* Bornet which had only been reported by Macoun previously, in 1869 and 1884 respectively. This list is designed to put on record what has been found to the present. Some determinations will undoubtedly be questioned but, in every case, they have been identified by professional lichenologists in major herbaria. It should be noted that the cyanobacterial morphotype of *Sticta canariensis* (Bory) Bory ex Delise (Syn. *S. dufourii* Delise) reported by Irwin Brodo from Silver Islet in 1965 would be a new record for North America.

I.Brodo is writing up a report for publication (pers.comm.)The most comprehensive set of specimens is in the Canadian Museum of Nature Lichen Herbarium (CANL) in Ottawa. This has replicates of almost all the Garton collections and many of Barclay-Estrup's and Wetmore's as well as specimens found by numerous other collectors, from Macoun to the present day. All species included in this list have voucher specimens either in CANL (C), LKHD (L), MIN (M) MSC, or TRTC (T). Details of all known collections are available from LKHD. In some cases there are also specimens in the University of Calgary (A) and the New York Botanical Garden. Taxa are annotated briefly with the collector, number and location of one specimen (see abbreviations below). A code letter (see above) is given for the herbarium in which they are located.

The Lichens of Thunder Bay District Ontario, Canada

+ indicates commoner species recorded from 10 or more locations.
* indicates species reported once only.

Nomenclature, with a few more recent exceptions, follows Egan, 1987, 1989, 1990, 1991.

Abbreviations for Collectors & Locations

PB Paul Barclay-Estrup
CB Charles Bird
IB Irwin Brodo
JC Joan Crowe
BD Beth Dennison
CG Claude Garton
CW Clifford Wetmore
LT Lief Tibell

KF Kakabeka Falls
MM Mount McKay
Nip Nipigon
OC Ouimet Canyon
Puk Pukaskwa National Park
RF Rainbow Falls
SGP Sleeping Giant Prov. Pk. (Sibley Pen.)
SI Slate Islands

Acarospora americana Magnusson - CW 28719 SI (M)
Acarospora badiofusca (Nyl.) Th. Fr. - CW 25162 SI (M)
Acarospora fuscata (Nyl.) Arnold - IB 6029 OC (C)
Acarospora glaucocarpa (Ach.) Körber - IB 6245 Lake Nip (C)
* *Amygdalaria panaeola* (Ach.) Hertel & Brodo - CW 25504 SI (C)
+ *Anaptychia setifera* Räsänen - CG 11301 SGP (L)
* *Anisomeridium biforme* (Borrer in Hook. & Sow.) R.C.Harris in Vězda - JC 1890 Crystal Bay (L)
+ *Arctoparmelia centrifuga* (L.) Hale - IB 6312 RF (C)
Arthonia diffusella Fink in Hedr. - CW 28617 SI (M)
Arthonia dispersa (Schrader) Nyl. - CW 28483 SI (M)
Arthonia fuliginosa (Schaerer) Flotow - CW 25275 SI (M)
* *Arthonia patellulata* Nyl. - CW 25195 SI (M)
* *Arthonia spadicea* Leighton - CW 29447 SI (C)
Aspicilia alphoplaca (Wahlenb. in Ach.) Poelt & Leuck. - BD 87 MM (C)
Aspicilia caesiocinerea (Nyl. ex Malbr.) Arn. - CW 29692 SI (C)
+ *Aspicilia cinerea* (L.) Körber - IB 13563 MM (C)
* *Aspicilia supertegens* Arnold - IB 6195 Nip (C)
+ *Aspicilia verrucigera* Hue - IB 6271 Nip Bay (C)
Bacidia laurocerasi (Del. ex Duby)Ozenda & Clauz. - CW 25256 SI (M)
Bacidia naegelii (Hepp) Zahlbr. - CW 28224 SI (M)
Bacidia polychroa (Th.Fr.) Körber - CG 23583 Marks Twp (L)
* *Bacidia rosella* (Pers.) de Not. - CW 29024 SI (M)
* *Bacidia rubella* (Hoffm.) Massal. - CG 23215 Black Bay (L)

Bacidia schweintzii (Tuck.) A. Schneider - CW 28593 SI (M)
* *Baeomyces carneus* Flörke - CW 28865 SI (M)
Baeomyces rufus (Huds.) Rebent. - IB 6006 OC (C)
Biatora epixanthoides (Nyl.) Diederich - CW 28538 SI (M)
Biatora helvola (Körber) Hellbom - PB 11067 MM (C)
Biatora sphaeroides (Dickson) Körber - CG 10776 SGP (L)
Biatora vernalis (L.) Fr. - IB 6174 NIP (C)
+ *Bryoria capillaris* (Ach.) Brodo & D. Hawksw. - CW 25120 SI (M)
Bryoria chalybeiformis (L.) Brodo & D. Hawksw. - CW 28710 SI (M)
+ *Bryoria furcellata* (Fr.) Brodo & D. Hawksw. - CG 5499 OC (L)
Bryoria fuscescens (Gyelnik) Brodo & D. Hawksw. - IB 6335D RF (C)
+ *Bryoria nadvornikiana* (Gyeln.) Brodo & Hawksw. - IB 13732 SGP (C)
* *Bryoria tenuis* (E.Dahl) Brodo & D. Hawksw. - CW 28708 SI (M)
+ *Bryoria trichodes* (Michaux) Brodo & D. Hawksw. - IB 6514B Neys (C)
Buellia arnoldii Servìt - CW 25555 SI (M)
Buellia disciformis (Fr.) Mudd - IB 6193 Nip (C)
Buellia punctata (Hoffm.) Massal. - CG 10174 Dorion (C)
* *Buellia stigmaea* Tuck. - Henssen 14308C KF (C)
Buellia stillingiana Steiner - IB 6136 Nip (C)
Calicium salicinum Pers. - IB 6486B Neys (C)
Calicium trabellinum (Ach.) Ach. - CW 25059 SI (M)
* *Calicium viride* Pers. - CW 28791 SI (M)
* *Caloplaca arenaria* (Pers.) Müll.Arg. - CW 29736 SI (M)
+ *Caloplaca cerina* (Ehrh. ex Hedwig) Th. Fr. - IB 13658 KF (C)
Caloplaca chrysophthalma Degel. - IB 13690 Raith (C)
* *Caloplaca cirrochroa* (Ach.) Th. Fr. - CW 29128 SI (M)
* *Caloplaca discolor* (Willey) Fink - CW 29040 SI (M)
* *Caloplaca epithallina* Lynge - CW 28727B SI (M)
Caloplaca flavorubescens (Huds.) Laundon - IB 13677 KF (C)
Caloplaca flavovirescens (Wulfen) Dalla Torre & Sarnth. - CW 29520 SI (C)
+ *Caloplaca holocarpa* (Hoffm.) Wade - CW 25052 SI (M)
Caloplaca microphyllina (Tuck.) Hasse - CG 15938 N.Fowl L. (L)
+ *Caloplaca ulmorum* (Fink) Fink - PB 10651 MM (C)
+ *Candelaria concolor* (Dickson) B.Stein - CG 10586 O'Connor Twp. (L)
Candelariella efflorescens R.C. Harris & Buck - CW 29206 SI (M)
+ *Candelariella vitellina* (Hoffm.) Müll.Arg. - CW 29316 SI (C)
Candelariella xanthostigma (Ach.) Lettau - CW 29216 SI (C)
* *Catapyrenium lachneum* (Ach.) R.Sant. - R.R.Ireland 15507 OC (C)
Catillaria glauconigrans (Tuck.) Hasse - PB 17790 MM (C)
Catinaria atropurpurea (Schaerer) Vězda & Poelt - CW 25589 SI (C)
Cetraria arenaria Kärnef. - de Vries 553.59 St. Ignace Is. (C)
Cetraria ericetorum Opiz - IB 13759 SGP (C)
+ *Cetraria hepatizon* (Ach.) Vainio - IB 16035 nr Terrace Bay (C)

+ *Cetraria islandica* (L.) Ach. - Ahti 4812 L.Nip. (L)
Cetraria nivalis (L.) Ach. - Ahti B8 Paradise Is. (L)
+ *Cetrelia chicitae* (Culb.) Culb & C. Culb. - IB 5944 SGP (C)
+ *Cetrelia olivetorum* (Nyl.) Culb & C.Culb. - PB 6846 Pass L. (C)
Chaenotheca brunneola (Ach.) Müll.Arg. - IB 6325 RF (C)
Chaenotheca chrysocephala (Turner ex Ach.) Th. Fr. - CW 28667 SI (C)
+ *Chaenotheca ferruginea* (Turn. ex Sm.) Mig. - IB 13726 Raith (C)
Chaenotheca furfuracea (L.) Tibell - CW 29462 SI (C)
Chaenotheca hispidula (Ach.) Zahlbr. - LT 5311 Whitefish L. (C)
Chaenotheca stemonea (Ach.) Müll.Arg. - LT 5267 Whitefish L. (C)
Chaenotheca trichialis (Ach.) Th. Fr. - CW 25043 SI (C)
Chaenothecopsis debilis (Turner & Borrer ex Sm.) Tibell - CW 28928 SI (C)
Chaenothecopsis lignicola (Nádv.)A.Schmidt - CW 29451A SI (C)
* *Chaenothecopsis pusilla* (Ach.) A.Schmidt - CW 28525 SI (M)
* *Chaenothecopsis vidireagens* (Nádv.) A.Schmidt - CG 15383 OC (L)
Chrysothrix chlorina (Ach.) Laundon - PB 9819 Silver Mt. (C)
+ *Cladina arbuscula* (Wallr.) Hale & Culb. - IB 6014 OC (C)
+ *Cladina mitis* (Sandst.) Hustich - CG 5424 Rossport (L)
+ *Cladina rangiferina* (L.) Nyl. - CG 4488 OC (L)
+ *Cladina stellaris* (Opiz) Brodo - CG 4478 Bowman Is.(L)
Cladina stygia (Fr.) Ahti - de Vries 561.59 St. Ignace (C)
Cladonia acuminata (Ach.) Norrlin - CW 28926 SI (M)
+ *Cladonia amaurocraea* (Flörke) Schaerer - CG 6338 St. Ignace (L)
+ *Cladonia bacillaris* Nyl. - PB 6936 Mabella (C)
Cladonia botrytes (K. Hagen) Willd. - IB 13582 Brulé Bay (C)
Cladonia caespiticia (Pers.) Flörke - JC 2013a Cavern L. Canyon (L)
Cladonia cariosa (Ach.) Sprengel - CG 10854 Beardmore (L)
+ *Cladonia cenotea* (Ach.) Schaerer - IB 6331 RF (C)
+ *Cladonia cervicornis* (Ach.) Flotow
ssp. *verticillata* (Hoffm.) Ahti - CG 5896 OC (L)
+ *Cladonia chlorophaea* (Flörke ex Sommerf.)Spreng. - CG 5977 SGP (L)
+ *Cladonia coccifera* (L.) Willd. - CG 6390 St. Ignace (L)
+ *Cladonia coniocraea* auct. - IB 6311 RF (C)
Cladonia cornuta (L.) Hoffm. - IB 6328 RF (C)
+ *Cladonia crispata* (Ach.) Flotow - CG 10783 SGP (L)
+ *Cladonia cristatella* Tuck. - CG 5718 Paipoonge (L)
Cladonia cyanipes (Sommerf.) Nyl. - CW 28417 SI (C)
+ *Cladonia deformis* (L.) Hoffm. - CG 5717 Upsala (L)
Cladonia digitata (L.)Hoffm. - CW 28506 SI (C)
+ *Cladonia fimbriata* (L.) Fr. - CG 6722 St. Ignace (L)
+ *Cladonia furcata* (Huds.) Schrader - CG 5299 MM (L)
Cladonia gracilis (L.) Willd.
+ ssp. *gracilis* - IB 6428 Terrace Bay (C)

+ ssp. *turbinata* (Ach.) Ahti - CG 23205 Pearl (C)
* *Cladonia grayi* G.K.Merr ex Sandst. - Losee 37 Raith (C)
* *Cladonia macrophylla* (Schaerer) Stenh. - Ahti Croll Twp (L)
* *Cladonia magyarica* Vainio - Keddy CANL 69923 Puk (C)
Cladonia maxima (Asah.) Ahti - CG 22651 L.Nip (L)
Cladonia merochlorophaea Asah. - IB 5996 SGP (C)
+ *Cladonia multiformis* G.K.Merr. - CG 5984 SGP (L)
+ *Cladonia phyllophora* Ehrh. ex Hoffm. - CG 5895 OC (L)
+ *Cladonia pleurota* (Flörke) Schaerer - CG 6253 St.Ignace (C)
+ *Cladonia pyxidata* (L.) Hoffm. - CG 5365 OC (L)
Cladonia rei Schaerer - CG 5580 Rosslyn (C)
+ *Cladonia scabriuscula* (Delise in Duby) Leighton - Ahti 4092 L.Nip (L)
+ *Cladonia squamosa* (Scop.) Hoffm. - CG 4510 Terrace Bay (L)
Cladonia subulata (L.) Weber ex Wigg. - PB 6110 Stanley (C)
Cladonia sulphurina (Michaux) Fr. - IB 16046B Terrace Bay (C)
+ *Cladonia turgida* Ehrh.ex Hoffm. - CG 5951 SGP (L)
+ *Cladonia uncialis* (L.) Weber ex Wigg. - CG 4489 OC (L)
Cliostomum griffithii (Sm.) Coppins - CW 25361 SI (C)
* *Collema flaccidum* (Ach.) Ach. - CG 10634 Whitefish L. (L) - also reported by Macoun
* *Collema fragrans* (Sm.) Ach. - Case Hawkeye Lake (C)
* *Collema furfuraceum* (Arnold) Du Rietz - IB 6274A Nip Bay (C)
Collema nigrescens (Huds.) DC - IB 13508 Nip R. (C)
* *Collema pulcellum* Ach. - IB 6019 OC (C)
* *Collema pulchellum* Ach. var. *subnigrescens* (Müll.Arg.) Degel. - IB 13721 Abitibi Woodlands Lab. (C)
+ *Collema subflaccidum* Degel. - IB 5972 SGP (C)
* *Collema undulatum* Laurer ex Flotow - CW 25156 SI (M)
* *Cyphelium tigillare* (Ach.) Ach. - CG 10160 Black Bay (C)
+ *Dermatocarpon luridum* (With.) Laundon - CG 5884 Trowbridge Falls (L)
Dermatocarpon miniatum (L.) Mann - CW 29638 SI (C)
* *Dermatocarpon moulinsii* (Mont.) Zahlbr. - IB 13646 KF (C
* *Dimelaena oreina* (Ach.) Norman - CW 29695 SI (C)
* *Diploschistes aeneus* (Müll.Arg.) Lumbsch - CW 29257 SI (C)
* *Diploschistes muscorum* (Scop.) R.Sant. - Boisvert Silver Harb. (L)
Diploschistes scruposus (Schreber) Norman - IB 6427 Terrace Bay (C)
* *Diplotomma alboatrum* (Hoffm.) Flotow - Henssen & Cain 14308 KF (T)
* *Ephebe lanata* (L.) Vainio - IB 6363 Rainbow Falls (C)
+ *Evernia mesomorpha* Nyl. - CG 4456 Current R. (L)
Evernia prunastri (L.) Ach. - Cain 19602 Nakina (T)
+ *Flavoparmelia caperata* (L.) Hale - CG 5583 SGP (L)
Flavopunctelia flaventior (Stirton) Hale - CG 22700 L.Nip (L)
* *Gonohymenia nigritella* (Lettau) Henssen - JC 1801 Silver Harb. (L)

Graphis scripta (L.) Ach. - PB 11122 MM (C)
Heterodermia obscurata (Nyl.) Trevisan - IB 6369 RF (C)
+ *Heterodermia speciosa* (Wulfen) Trevisan - IB 6082 OC (C)
Hypocenomyce anthrocophila (Nyl.) James & G.Schneider - IB 6660 Raith (C)
Hypocenomyce scalaris (Ach. ex Liljeblad) M.Choisy - IB 13648 KF (C)
* *Hypogymnia bitteri* (Lynge) Ahti - IB 6616 near Marathon (C)
+ *Hypogymnia physodes* (L.) Nyl. - CG 4455 Current R. (L)
Hypogymnia tubulosa (Schaerer) Havaas - IB 6517B Neys (C)
* *Hypogymnia vittata* (Ach.) Parr - CW 29380 SI (C)
+ *Icmadophila ericetorum* (L.) Zahlbr. - CG 10727 Brulé Bay (L)
Imshaugia aleurites (Ach.) S.F.Meyer - IB 6024 Nip (C)
Imshaugia placorodia (Ach.) S.F.Meyer - PB 5368 Onion L. (C)
Julella fallaciosa (Stizenb. ex Arnold)R.C.Harris - IB 6061 OC (C)
Lasallia papulosa (Ach.) Llano - PB 3029 Fraleigh Lake (C)
* *Lecanactis chloroconia* Tuck. - CG 19725 Pigeon River (L)
* *Lecania fuscella* (Schaerer) Körber - Macoun 1793 Nip (C)
+ *Lecanora allophana* Nyl. - IB 6022 OC (C)
Lecanora argentea Oxner & Volk. (syn. *L. fuliginosa* Brodo (Lumbsch, 1992))- IB 13735 SGP (C)
Lecanora argopholis (Ach.) Ach. - IB 6552 Neys (C)
Lecanora cateilea (Ach.) Massal. - IB 6508 Neys (C)
Lecanora cenisia Ach. - IB 13743B SGP (C)
+ *Lecanora circumborealis* Brodo & Vitikainen - IB 6302 RF (C)
* *Lecanora dispersa* (Pers.) Sommerf. - CW 29022A SI (C)
* *Lecanora hagenii* (Ach.) Ach. - CG 23080 Lake Nip (L)
* *Lecanora hybocarpa* (Tuck.) Brodo - JC 1950 Crystal Bay (L)
Lecanora impudens Degel. - CG 10170 Dorion (C)
Lecanora meridionalis Magnusson - IB 6642A White L. (C)
Lecanora muralis (Schreber) Rabenh. - IB 6396 RF (C)
Lecanora opiniconensis Brodo - CG 5467 Crystal Beach (C)
Lecanora pallida (Schreber) Rabenh. - IB 13762 SGP (C)
Lecanora perplexa Brodo - Henssen 14276P Heron Bay (C)
Lecanora polytropa (Hoffm.) Rabenh. - IB 13777 SGP (C)
+ *Lecanora pulicaris* (Pers.) Ach. - IB 6524 Neys (C)
* *Lecanora reagens* Norman - CW 28915 SI (C)
Lecanora rugosella Zahlbr. - IB 10375 MM (C)
Lecanora rupicola (L.) Zahlbr. - IB 6100 OC (C)
* *Lecanora saligna* (Schrader) Zahlbr. - CW 25402 SI (C)
* *Lecanora subintricata* (Nyl.) Th. Fr. - IB 6579 Neys (C)
Lecanora symmicta (Ach.) Ach. - PB 5528 Dog L. Rd (C)
Lecanora thysanophora R.C.Harris ined. - PB 5919 Wild Goose Pk (C)
Lecanora wisconsinensis Magnusson - Cain 20258 Beardmore (C)
* *Lecidea atrobrunnea* (Ramond in Lam.& DC.) Schaerer - CW 29681 SI (C)

* *Lecidea cinnabarina* Sommerf. - CW 28454 SI (C)
* *Lecidea epixanthoidiza* Nyl. - CW 29147 SI (C)
* *Lecidea lithophila* (Ach.) Ach. - IB 6385 Rainbow Falls (C)
* *Lecidea lurida* (Ach.) DC. - Henssen & Cain 14308A KF (T)
* *Lecidea oreinoides* (Körber) W. Weber & Hertel - Macoun 2908 Lake Nip (C)
Lecidea plana (Lahm in Körber) Nyl. - CW 29734 SI (C)
Lecidea tessellata Flörke- IB 6555 Neys (C)
* *Lecidella carpathica* Körber Thomson - 13070 Lake Sagnagon (C)
* *Lecidella elaeochroma* (Ach.) M.Choisy - IB 6266 Nip Bay (C)
Lecidella euphorea (Flörke) Hertel - IB 6511 Neys (C)
Lecidella stigmatea (Ach.) Hertel & Leuck. - CG 10611 Pt Arthur (C)
* *Lempholemma myriococcum* (Ach.) Th. Fr. - Macoun in 1884 L. Nip (C)
+ *Lepraria finkii* (B. de Lesd. in Hue) R.C.Harris - PB 9796 Pigeon Bay (C)
Lepraria incana (L.) Ach. - PB 9774 Lenore L. (C)
Lepraria neglecta (Nyl.) Lettau - PB 6531 SGP (C)
Lepraria zonata Brodo - PB 9783 Cloud Bay (C)
Leproloma membranaceum (Dickson) Vainio - CG 10699 Oskondaga R. (C)
* *Leproplaca chrysodeta* (Vainio ex Räs.) Laundon - CW 29314 SI (C)
Leptogium burnetiae Dodge - CW 28392 SI (C)
* *Leptogium californicum* Tuck. - Macoun in 1884 L.Nip (C)
+ *Leptogium cyanescens* (Rabenh.) Körber - IB 6092 OC (C)
Leptogium lichenoides (L.) Zahlbr. - CW 28394A SI (C)
+ *Leptogium saturninum* (Dickson) Nyl. - IB 13739 SGP (C)
* *Leptogium teretiusculum* (Wallr.) Arn. - CG 19898 O'Connor Twp. (L)
* *Leptorhaphis atomaria* (Ach.) Szat. - IB 6372 RF (C)
Leptorhaphis contorta Degel. - IB 6685 White R.(C)
Leptorhaphis epidermidis (Ach.) Th. Fr. - IB 6198 L. Nip (C)
+ *Lobaria pulmonaria* (L.) Hoffm. - CG 5502 OC (L)
Lobaria quercizans Michaux - IB 13788 SGP (C)
* *Lobaria scrobiculata* (Scop.) DC. in Lam. & DC. - IB 13803 SGP (C)
Lopadium pezizoideum (Ach.) Körber - IB 6377 RF (C)
* *Loxospora cismonica* (Beltram.) Hafellner - CW 29601 SI (C)
Loxospora elatina (Ach.) Massal. - CW 29083 SI (C)
* *Loxospora ochrophaea* (Tuck.) R.C.Harris in Egan - CW 29090 SI (C)
Loxospora pustulata (Brodo & Culb.) R.C.Harris - CG 10630 Whitefish L. (L)
* *Megaspora verrucosa* (Ach.) Hafellner & V.Wirth - IB 6091 OC (C)
Melanelia disjuncta (Erichsen) Essl. - IB 6578 Neys(C)
+ *Melanelia exasperatula* (Nyl.) Essl. - IB 6098 OC (C)
Melanelia infumata (Nyl.) Essl. - IB 13479 Lake Helen (C)
+ *Melanelia olivacea* (L.) Essl. - IB 6225 L.Nip (C)
Melanelia panniformis (Nyl.) Essl. - IB 6207 Nip (C)
+ *Melanelia septentrionalis* (Lynge) Essl. - IB 13589 Brulé Bay (C)
Melanelia sorediata (Ach.) Goward & Ahti - IB 6104 OC (C)

+ *Melanelia subaurifera* (Nyl.) Essl. - PB 5172 S. Gillies (C)
* *Melanelia tominii* (Oxner) Essl. (syn. *M. substygia* (Räsänen) Essl.) - CW 28695 SI (C)
* *Micarea prasina* Fr. - CW 28261 SI (C)
* *Microcalicium arenarium* (Hampe ex Massal.) Tibell - CG 15382 Rim of OC (L)
* *Microcalicium disseminatum* (Ach.) Vainio - CW 28801B SI (C)
+ *Mycobilimbia berengeriana* (Mass.) Hafel. & V.Wirth - PB 3945 Finnmark (C)
* *Mycobilimbia hypnorum* (Lib.)Kalb. & Hafellner in V.Wirth - CW 28484 SI (C)
Mycobilimbia obscurata (Sommerf.) Rehm - IB 6373 RF (C)
Mycobilimbia sabuletorum (Schreber) Hafellner - IB 6032 OC (C)
* *Mycoblastus alpinus* (Fr.) Kernst. - CG 22760 L.Nip (L)
+ *Mycoblastus sanguinarius* (L.) Norman - IB 6051 OC (C)
Mycocalicium subtile (Pers.) Szat. - IB 5967 SGP (C)
+ *Nephroma bellum* (Sprengel) Tuck. - IB 6191 Nip (C)
+ *Nephroma helveticum* Ach. - IB 6203 Nip (C)
+ *Nephroma parile* (Ach.) Ach. - IB 5980 SGP (C)
Nephroma resupinatum (L.) Ach. - IB 13489 Nip (C)
Ochrolechia androgyna (Hoffm.) Arnold - CG 18834 Little Dog L. (L)
* *Ochrolechia mexicana* Vainio (Ochrolechia spp. see Brodo, 1991) - Malachowski 6690H Waweig L. (MSC)
* *Ochrolechia pseudopallescens* Brodo - Imshaug 59641 L. Nip (MSC)
* *Ochrolechia trochophora* (Vainio) Oshio (syn. *O. rosella* (Müll. Arg.) Vers.) - CG 15338 Arrow R. (L)
* *Omphalina hudsoniana* (Jenn.) Bigelow - CG 22115 H.11 Reflection L. (L) (syn. *Phytoconis viridis* (Ach.) Redh. & Kuyper)
Opegrapha varia Pers. - CG 23215 Black Bay (L)
* *Pachyspora verrucosa* (Ach.) Massal. - IB 6091 OC (C)
Pannaria conoplea (Ach.) Bory - IB 6540 Neys (C)
Pannaria hookeri (Borrer ex Sm.) Nyl. - CG 10847 Elgin L. (C)
Pannaria leucophaea (Vahl) P.Jørg. - IB 6289 Nip Bay (C)
Pannaria leucosticta (Tuck. in Darl.) Tuck. ex Nyl. - CG 18221 Pic R. (L)
Pannaria praetermissa Nyl. in Chyd. & Furuhj. - BD 766 OC (C)
* *Parmelia fraudans* (Nyl.) Nyl. - Macoun in 1884 redet. Ahti 1963 (C)
+ *Parmelia omphalodes* (L.) Ach. - CG 5451 MM (L)
+ *Parmelia saxatilis* (L.) Ach. - CG 6234 St. Ignace (L)
+ *Parmelia squarrosa* Hale - IB 6179 Nip (C)
+ *Parmelia sulcata* Taylor - CG 5413 Rossport (L)
Parmeliella triptophylla (Ach.) Müll.Arg. - IB 6697 White L. (C)
Parmeliopsis ambigua (Wulfen in Jacq.)Nyl. - IB 6573 Neys (C)
+ *Parmeliopsis hyperopta* (Ach.) Arnold - IB 6342 RF (C)
Parmotrema arnoldii (Du Rietz) Hale - IB 6359 RF (C)
Parmotrema crinitum (Ach.) M.Choisy - IB 13738 SGP (C)
+ *Peltigera aphthosa* (L.) Willd. - CG 5457 MM (L)
+ *Peltigera canina* (L.) Willd. - CG 5373 OC (L)

Peltigera collina (Ach.) Schrader - IB 6586 nr Marathon (C)
+ *Peltigera didactyla* (With.) Laundon - IB 6352 RF (C)
+ *Peltigera elisabethae* Gyelnik - IB 6173 Nip (C)
+ *Peltigera evansiana* Gyelnik - PB 7163 Pie Is. (C)
+ *Peltigera horizontalis* (Huds.) Baumg. - IB 5925 SGP (C)
Peltigera lepidophora (Nyl. ex Vainio) Bitter - PB 6786 Pine Bay (C)
+ *Peltigera leucophlebia* (Nyl.) Gyelnik - PB 2340 Dog L. Rd. (C)
+ *Peltigera malacea* (Ach.) Funck - IB 5983 SGP (C)
+ *Peltigera neckeri* Hepp. ex Müll.Arg. - IB 6575 Neys (C)
+ *Peltigera neopolydactyla* (Gyelnik) Gyelnik - IB 6341 RF (C)
+ *Peltigera polydactyla* (Necker) Hoffm. - CG 5400 Rossport (L)
+ *Peltigera ponojensis* Gyelnik - CG 16478 Puk (C)
+ *Peltigera praetextata* (Flörke ex Sommerf.) Zopf - IB 5948 SGP (C)
+ *Peltigera rufescens* (Weis) Humb. - CG 5973 SGP (L)
Peltigera scabrosa Th. Fr. - Zoladeski 41 Nama Ck (C)
Peltigera venosa (L.) Hoffm. - CG 5820 Bat Cave (L)
+ *Pertusaria amara* (Ach.) Nyl. - IB 6356 RF (C)
* *Pertusaria consocians* Dibben - CG 7180 Whitefish Lake (L)
* *Pertusaria hymenea* (Ach.) Schaerer - IB 6266 Nip Bay (C)
* *Pertusaria multipunctoides* Dibben - CG 7179 Whitefish L. (C)
* *Pertusaria velata* (Turner) Nyl. - CG 10631 Whitefish L. (L)
* *Phacopsis oxyspora* (Tul.) Triebel & Rambold - Macoun 2723 L.Nip (C)
* *Phaeocalicium compressulum* (Nyl. ex Szat.) A.Schmidt - CW 28672 SI (C)
Phaeocalicium populneum (Brond. ex Duby) A.Schmidt - LT 5315 Stanley (C)
Phaeophyscia adiastola (Essl.) Essl. - PB 7079 Squaw Bay (C)
Phaeophyscia endococcina (Körber) Moberg-BD 762 OC (C)
* *Phaeophyscia hirsuta* (Mereschk.) Essl. - R. Sims 10 Blind Line Rd (L)
Phaeophyscia hispidula (Ach.) Essl - Cain 26243 KF (C)
* *Phaeophyscia kairamoi* (Vainio) Moberg - Macoun 878 L.Nip redet. 1983 (C)
Phaeophyscia orbicularis (Necker) Moberg - IB 6246 L. Nip (C)
Phaeophyscia pusilloides (Zahlbr.) Essl. - PB 2174 L.U. (C)
Phaeophyscia rubropulchra (Degel.) Essl. - IB 16127 White L. (C)
Phaeophyscia sciastra (Ach.) Moberg - IB 6567 Neys (C)
Phlyctis argena (Sprengel) Flotow - CG 19777 Current R. (C)
+ *Physcia adscendens* (Fr.) H.Olivier - IB 5981 SGP (C)
+ *Physcia aipolia* (Ehrh. ex Humb.) Fürnr. - CG 7159 H 130 at Kam R. (L)
+ *Physcia caesia* (Hoffm.) Fürnr. - PB 6517 SGP (C)
Physcia dubia (Hoffm.) Lettau - PB 5861 Wildgoose Pk. (C)
Physcia millegrana Degel. - PB 6392 Onion L. (C)
Physcia phaea (Tuck.) Thomson - IB 13500 Helen L. (C)
Physcia stellaris (L.) Nyl. - PB 5432 nr H.597 (C)
Physcia subtilis Degel. - IB 6268 Nip Bay (C)
+ *Physconia detersa* (Nyl.) Poelt - CG 6061 SGP (L)

* *Physconia distorta* (With.) Laundon - CG 22762 L.Nip (L)
+ *Physconia muscigena* (Ach.) Poelt - CG 16359 Whitefish R. (C)
+ *Physconia perisidiosa* (Erichsen) Moberg - PB 5488 Cloud L. (C)
Placynthium asperellum (Ach.) Trevisan - Cain 26510 25 km E. of Nip (T)
* *Placynthium flabellosum* (Tuck.) Zahlbr. - Macoun 1399 Nip R. rev. Henssen 1962 (C)
* *Placynthium nigrum* (Huds.) S.Gray - IB 6366 RF (C)
Platismatia glauca (L.) W.Culb. & C.Culb. - IB 6368 RF (C)
+ *Platismatia tuckermannii* (Oakes) W.Culb. & C.Culb. - CG 7190 Whitefish L. (L)
* *Polyblastia cupularis* Massal. - CW 28849 SI (C)
* *Porpidia calcarea* Gowan - CW 25451 SI (M)
Porpidia cinereoatra (Ach.) Hertel & Knoph - CW 28423 SI (M)
Porpidia crustulata (Ach.) Hertel & Knoph - IB 16096B nr. Terrace Bay (C)
Porpidia diversa (Lowe) Gowan - IB 6299 RF (C)
Porpidia herteliana Gowan - CW 25558 SI (C)
Porpidia macrocarpa (DC. in Lam. & DC.) Hertel & Schwab - PB 19091 MM (L)
Porpidia speirea (Ach.) Krempelh. - CW 25423 SI (C)
* *Protoblastenia rupestris* (Scop.) Steiner - CW 29504 SI (C)
* *Protoparmelia badia* (Hoffm.) Hafellner - CW 29671 SI (C)
Pseudevernia consocians (Vainio) Hale & W.Culb. - IB 6649 White L. (C)
Pseudocyphellaria crocata (L.) Vainio - IB 13081 SGP (C)
* *Pseudoparmelia sphaerospora* (Nyl.) Hale - CG 18221 Pic R. (L)
Psilolechia lucida (Ach.) M.Choisy - PB 9785 Cloud Bay (C)
Psorula rufonigra (Tuck.) G.Schneider - CW 28709 SI (C)
+ *Punctelia rudecta* (Ach.) Krog - Ahti 4309 L. Nip (L)
* *Punctelia stictica* (Duby) Krog - IB 5995 SGP (C)
Punctelia subrudecta (Nyl.) Krog - CW 29210 SI (C)
+ *Ramalina americana* Hale - CG 7204 Current R. (L)
Ramalina calicaris (L.)Fr. - Losee CANL 75213 Anders L.(C)
Ramalina dilacerata (Hoffm.)Hoffm. - IB 16093 W. of Marathon (C)
Ramalina farinacea (L.) Ach. - Case 7353 Hawkeye L. (C)
+ *Ramalina intermedia* (Delise ex Nyl.) Nyl. - CG 5688 Trowbridge Falls (L)
Ramalina obtusata (Arnold) Bitter - IB 13668 KF (C)
Ramalina pollinaria (Westr.) Ach. - CG 10916 Greenwater L. (L)
Ramalina roesleri (Hochst. ex Schaerer) Hue - CW 25369 SI (C)
Ramalina thrausta (Ach.) Nyl. - PB 5742 SGP (C)
Rhizocarpon badioatrum (Flörke ex Sprengel) Th. Fr. - PB 9774 Lenore L. (C)
* *Rhizocarpon cinereovirens* (Müll.Arg.) Vainio - IB 6608 near Marathon (C)
Rhizocarpon disporum (Naeg. ex Hepp.) Müll.Arg. - IB 6393 RF (C)
Rhizocarpon geographicum (L.) DC. - IB 6306 RF (C)
Rhizocarpon grande (Flörke ex Flotow) Arnold - IB 6188 Nip (C)
Rhizocarpon jemtlandicum (Malme) Malme - IB 6304 RF (C)
* *Rhizocarpon lecanorinum* Anders - Erbisch 617 Rossport (C)
Rhizocarpon macrosporum Räsänen - IB 6403 RF (C)

Rhizocarpon obscuratum (Ach.) Massal. - IB 6068 OC (C)
* *Rhizocarpon oederi* (Weber) Körber - PB 10531 MM (C)
* *Rhizocarpon plicatile* (Leighton) A. L. Sm. - CW 28355 SI (C)
* *Rhizocarpon polycarpum* (Hepp) Th. Fr. - IB 6617 nr Marathon (C)
Rhizocarpon sphaerosporum Räsänen - Thorn T-Harbour SGP (C)
* *Rhizocarpon subgeminatum* Eitner - CW 29456 SI (C)
+ *Rhizoplaca chrysoleuca* (Sm.) Zopf - PB 7103 Spar Is. (C)
* *Rhizoplaca melanophthalma* (DC.) Leuck. & Poelt - CG 6080 Pie Is. (C)
* *Rinodina archaea* (Ach.) Arnold - IB 13797 SGP (C)
* *Rinodina dakotensis* Magnusson - IB 13678 KF (C)
* *Rinodina magnussonii* Sheard ined. - Meservier 1 Thunder Bay (C)
* *Rinodina turfacea* (Wahlenb.) Körber -IB 13641B KF (C)
* *Sarcogyne regularis* Körber - CB 20627 SGP (A)
* *Schaereria fuscocinerea* (Nyl.) Clauz. & Roux - CW 29733 SI (C)
* *Sclerophora nivea* (Hoffm.) Tibell - CG 15335 Arrow R. (C)
Scoliciosporum chlorococcum (Graewe ex Stenh.) Vězda - PB 10382 MM (C)
Scoliciosporum umbrinum (Ach.) Arnold - IB 5947 SGP (C)
+ *Solorina saccata* (L.) Ach. - IB 13682 KF (C)
* *Solorina spongiosa* (Ach.) Anzi - IB 6704 White Lake (C)
Sphinctrina turbinata (Pers.) de Not. - J.W.Thomson 13039 L. Sagnagon (C)
Spilonema paradoxum Bornet - JC 1802 Cavern L. Canyon (L)
* *Spilonema revertens* Nyl. - Henssen & Cain 14274B Heron Bay (T)
* *Staurothele areolata* (Ach.) Lettau - IB 13736 SGP (C)
Staurothele drummondii (Tuck.) Tuck. - IB 6556 Neys (C)
Staurothele fissa (Taylor) Zwackh - IB 6365 RF (C)
Stenocybe major Nyl. ex Körber - IB 6340 RF (C)
Stereocaulon alpinum Laurer ex Funck - IB 6154 Pine Portage (C)
* *Stereocaulon botrysum* Ach. - CG 11529 Squaretop Mt. (C)
* *Stereocaulon condensatum* Hoffm. - IB 6570 nr Marathon (C)
Stereocaulon dactylophyllum Flörke - PB 2485 Trail to Sawdust L. (C)
Stereocaulon glaucescens Tuck. - CG 20652 Red Rock (C)
Stereocaulon grande (Magnusson) Magnusson - CG 19264 SGP (L)
+ *Stereocaulon paschale* (L.) Hoffm. - CG 5821 Bat Cave (L)
* *Stereocaulon pileatum* Ach. - IB 6033 OC (C)
Stereocaulon rivulorum Magnusson - CG 22245 L.Nip (C)
+ *Stereocaulon saxatile* Magnusson - CG 11529 Squaretop Mt (L)
+ *Stereocaulon subcoralloides* (Nyl.) Nyl. - PB 2321 Dog L. Rd (C)
+ *Stereocaulon tomentosum* Fr. - CG 5419B Rossport (L)
* *Sticta canariensis* (Bory) Bory ex Delise (syn. *S. dufourii*) - IB 5961A SGP (C)
* *Synalissa symphorea* (Ach.) Nyl. - Henssen 14274A Heron Bay (C)
* *Tephromela atra* (Huds.) Hafellner - CW 25173 SI (C)
* *Thelidium pyrenophorum* (Ach.) Mudd - IB 6759 White Lake (C)
* *Toninia aromatica* (Turn. ex Sm.) Massal. - Macoun L.Nip (C)

* *Trapelia placodioides* Coppins & P.James - PB 19161 Mt Godfrey (L)
Trapeliopsis granulosa (Hoffm.) Lumbsch. - PB 2472 Nor'Westers (C)
* *Trapeliopsis viridescens* (Schrader) Coppins & P.James - CW 29506 SI (C)
+ *Tuckermannopsis americana* (Sprengel) Hale - IB 16085 nr Terrace Bay (C)
* *Tuckermannopsis aurescens* (Tuck.) Hale - IB 5984 SGP (C)
Tuckermannopsis ciliaris (Ach.) Gyelnik - CG 6233 ST. Ignace Is. (L)
+ *Tuckermannopsis oakesiana* (Tuck.) Hale - IB 6512 Neys (C)
Tuckermannopsis orbata (Nyl.) Lai - IB 16090B nr Terrace Bay (C)
+ *Tuckermannopsis sepincola* (Ehrh.) Hale - IB 6037 OC (C)
* *Umbilicaria arctica* (Ach.) Nyl. - CG 15592 Puk (C)
+ *Umbilicaria deusta* (L.) Baumg. - CG 5421 Rossport (L)
Umbilicaria hyperborea (Ach.) Hoffm. - IB 5952 SGP (C)
+ *Umbilicaria mammulata* (Ach.) Tuck. - CG 7468 Reflection L. (L)
+ *Umbilicaria muehlenbergii* (Ach.) Tuck. - CG 5401 Rossport (L)
+ *Umbilicaria vellea* (L.) Ach. - CG 5410 L. Nip (L)
+ *Usnea cavernosa* Tuck. - CG 5954 SGP (L)
+ *Usnea filipendula* Stirton - IB 5989 SGP (C)
+ *Usnea glabrata* (Ach.) Vainio - IB 5998A SGP (C)
+ *Usnea hirta* (L.) Weber ex Wigg. - CG 6393 St. Ignace (L)
Usnea lapponica Vainio - CW 25690 SI (M)
+ *Usnea longissima* Ach. - IB 6056 OC (C)
* *Usnea scabrata* Nyl. - CG 10158 Black Bay (C)
+ *Usnea subfloridana* Stirton - CG 5500 OC (L)
Usnea subfusca Stirton - Cain 21718 Nakina (C)
* *Usnea trichodea* Ach. - Losee Anders Lake (C)
* *Usnea variolosa* Mot. C - Cain 22286 Beardmore (C)
* *Verrucaria nigrescens* Pers. - Cain 26414 21 km E. of Nip (T)
+ *Vulpicida pinastri* (Scop.) Matts. & Lai (Mattson & Lai, 1993)
(syn. *T. pinastri* Scop. Hale) - CG 5433 MM (L)
+ *Xanthoparmelia conspersa* (Ehrh. ex Ach.) Hale - PB 6513 SGP (C)
+ *Xanthoparmelia cumberlandia* (Gyelnik) Hale - IB 5479 SGP (C)
+ *Xanthoparmelia somloënsis* (Gyelnik) Hale - IB 6329 RF (C)
* *Xanthoria candelaria* (L.) Th. Fr. - CW 28229 SI (C)
+ *Xanthoria elegans* (Link) Th. Fr. - IB 6562 Neys (C)
Xanthoria fallax (Hepp in Arnold) Arnold - IB 6206 Nip Bay (C)
+ *Xanthoria polycarpa* (Hoffm.) Rieber - IB 5970 SGP (C)
Xanthoria sorediata (Vainio) Poelt - CW 28731 SI (C)
Xylographa abietina (Pers.) Zahlbr. - IB 6137 Pine Portage (C)

Major Collectors: Teuvo Ahti, Paul Barclay-Estrup, Irwin M. Brodo, R. F. Cain, B. DeVries, Claude E. Garton, A. Hensson, John F. Macoun, Leif Tibell, Clifford C. Wetmore.

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Literature Cited

Brodo, I.M. 1991. Studies in the lichen genus Ochrolechia 2. Corticolous species of North America. *Canadian Journal of Botany* 69: 733-772.

Chapman, L.J. & Thomas. M.K. 1968. *The Climate of Northwestern Ontario.* Ontario Dept. of Transport, Meteorological Branch.

Egan, Robert S. 1987. A Fifth Checklist of the Lichen-Forming Lichenicolous and Allied Fungi of the Continental United States and Canada. *The Bryologist* 90(2) 77-173.

______________1989. Changes to the Fifth Checklist Edition I. *The Bryologist* 92(1) 68-72.

______________ 1990. Changes to the Fifth Checklist Edition II. *The Bryologist* 93(2) 211-219.

______________ 1991. Changes to the Fifth Checklist Edition III. *The Bryologist* 94(4) 396-400.

Given, D.R. & Soper J.H. 1981. The Arctic-Alpine Element of the Vascular Flora at Lake Superior. *Nat. Mus. Natural Sc. Botany* No. 10.

Lumbsch, H.T. 1992. *Lecanora argentea* Oxner & Volkova, the -correct name for *L. fuliginosa* Brodo and comments on -related species. *The Bryologist* 95: 430-432.

Mattson, J.E. & Lai, M.J. 1993. *Vulpicida* A new genus in Parmeliaceae (Lichenized Ascomycetes). *Mycotaxon* 46: 425-428.

Pye, E.G. 1968. *Geology and Scenery Book 1 — Rainy Lake East to Lake Superior.* Ont. Dept. of Mines.

________ 1969. *Geology and Scenery Book 2 — North Shore of Lake Superior.* Ont. Dept. of Mines.

Rowe, J.S. 1972. *Forest Regions of Canada.* Dept. of Env. Can. For. Serv., Ottawa, Ont. Publication No. 1300.

Sims, R.A., Towill, W.D., Baldwin, K.A., Wickware, G.M. 1989. *Forest Ecosystem Classification for Northwestern Ontario.* Forestry Canada/Ont. Min. of Nat. Res.

Zoltai, S.C. 1961. Glacial History of Part of Northwestern Ontario. *Proc. Geol. Ass. Can.* 13: 61-83.

___________ 1965. Glacial Features of the Quetico-Nipigon Area, Ontario. *Can. J. Earth Sci.* 2: 247-269.

___________ 1967. Glacial Features of the North—Central Lake Superior Region, Ontario. *Can. J. Earth Sci.* 4: 515-528.

***Sticta canariensis*: a new lichen for North America.**

Irwin M. Brodo[1]

It has been almost 30 years since Roy Cain, Beth Denison Kantrud, my wife Fenja and I clambered over the talus slope at the base of the Sleeping Giant mountain in the Thunder Bay District of Ontario, and discovered a puzzling *Sticta*. The *Sticta* turned out to be the cyanobacterial morphotype of *Sticta canariensis* (Bory) Bory ex Delise (Syn. *S. dufourii* Delise), a new record for North America. For one reason or another, the record was never published at that time. With the preparation of a list of the lichens of Thunder Bay District by Joan Crowe near completion (Crowe, pers. comm.), the time has come to document that record:

Canada. Ontario. THUNDER BAY DISTRICT: Sibley Provincial Park [= Sleeping Giant Prov. Park], Sawyer's Bay and trail to Sleeping Giant Mountain, 48°40'N, 88°45'W, *Picea-Betula* forest and talus slope, on talus slope, *Brodo 5961A*, 24 Aug.1965 (CANL).

The well-developed specimens have the typical marginal to laminal, finely dissected, lobate "isidia," and are virtually identical with material from Europe in CANL. The isidia of *S. weigelii* auct. (including *S. beauvoisii* Delise; see Harris 1984), and those of *S. sylvatica* (Hudson) Ach. and *S. fuliginosa* (Hoffm.) Ach., are more elongate or granular. In *S. weigelii*, the isidia are almost exclusively marginal, whereas in *S. sylvatica* and *S. fuliginosa*, they are mainly laminal. Purvis (1992) distinguishes the almost exclusively European *S. sylvatica* from the more widespread *S. fuliginosa* on the lobe type: divided into "multi-lobes" in *S. sylvatica*, and ± single-lobed to slightly indented in *S. fuliginosa*. Hale (1979) states that *S. sylvatica* may occur in scattered western localities, and there is a single collection from Minnesota (Cascade River State Park, *Brodo 5858a*) in CANL, verified by Peter James.

Sticta canariensis is a euoceanic species (belonging to the southern or "südatlantische" group according to Degelius [1935, sub *S. dufourei*]), one of several such species that are found on the Sibley Peninsula or nearby Slate Islands on the north shore of Lake Superior (Wetmore, unpublished). Examples are *Bryoria tenuis, Lobaria scrobiculata,* and *Pseudocyphellaria crocata*, The green algal morphotype of *Sticta canariensis* has not yet been found there.

---

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It is most interesting that the Sibley collection included some important new moss records as well: *Isothecium myosuroides* Brid. (Syn. *I. stoloniferum* Brid., *I. eumyosuroides* Dix.) and *I. alopecuroides* (Dubois) Isov. (Allen 1982). *Isothecium myosuroides* was new for Ontario, and a significant disjunction from the eastern and western populations (map in Allen 1983); *I. alopecuroides* was new for North America, with a second locality from Newfoundland (Allen 1982). *Isothecium myosuroides* is generally associated with humid, coniferous forests (Schofield 1992); *I. alopecuroides*, at least in Europe (based on specimens in CANM), is a species on rocks and stumps in mature, deciduous forests. Like the *Sticta canariensis*, the rare moss *Isothecium alopecuroides* has not been reported again from North America (Ireland et al. 1987).

Literature Cited

Allen, B.H. 1982. *Isothecium alopecuroides* new to North America. *The Bryologist* 85: 421-423.

__________ 1983. *Isothecium myosuroides* Brid. and *I. stoloniferum* Brid.: a quantitative study. *The Bryologist* 86: 358-364.

Degelius, G. 1935. Das ozeanische Element der Strauch- und Laubflechtenflora von Scandinavien. *Acta Phtogeographica Suecia* 7: 1-411.

Hale, M.E. 1979. *How to know the lichens*. Wm.C. Brown Co., Dubuque, Iowa.

Harris, R.C. 1984. *Sticta*, an "easy" genus becomes more difficult. *Evansia* 1: 7-8.

Ireland, R.R., G.R. Brassard, W.B. Schofield, and D.H. Vitt. 1987. Checklist of the mosses of Canada II. *Lindbergia* 13: 1-62.

Purvis, O.W. 1992. *Sticta*. In, Purvis, O.W. et al. *The lichen flora of Great Britain and Ireland*, Natural History Museum Publications, London.

Schofield, W.B. 1992. *Some common mosses of British Columbia*. Royal British Columbia Museum handbook, Victoria, B.C.

A Chemical Test for *Verrucaria*

Roger Rosentreter[1]

Investigation of the lichen flora in streams and rivers of western North America is difficult because of the lack of previous work on these species. Species of *Verrucaria*, a common fresh water genus, are difficult to macroscopically distinguish from many cyanobacteria and other aquatic, black-colored plant biota. Many *Verrucaria* species either lack or contain inconspicuous perithecia, or lack other macroscopic structures that distinguish them from associated organisms.

To overcome the problem with generic identity and improve recognition of ecological patterns in the field, a simple KOH test can be utilized. During periods of low water, KOH is applied to *Verrucaria*-like organisms on exposed stream bank rocks. The KOH dissolves or softens *Verrucaria* taxa, but does not affect the associated cyanobacteria. Repeated testing assists one with locating *Verrucaria*, and similar-looking material not dissolved by the KOH can be collected for reference.

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[1] United States Department of the Interior, Bureau of Land Management, Idaho State Office, 3380 Americana Terrace, Boise, Idaho 83706-2500

New Director of the Lichen Exchange

Dr. Thomas Nash, Department of Botany, Box 871601, Arizona State University, Tempe, AZ 85287-1601, has agreed to serve as the Director of the Lichen Exchange, replacing Claire Schmitt, who requested to be relieved of her duties after many years of service to the Society. Please send all future contributions for the Exchange to Tom Nash at the above address.

An additional North American locality for *Zygodon apiculatus*

Terry J. O'Brien[1]

Zygodon apiculatus (Orthotrichaceae) was described by Redfearn (1967) based on collections from sites in Dallas and Laclede counties in the Missouri Ozarks. Two additional localities, one in Alleghany Co., North Carolina, and the other in Barry Co. in the Missouri Ozarks, were reported by Vitt (1970) and Redfearn (1984), respectively.

An H. S. Conard collection from Waubonsie State Park in southwestern Iowa, originally determined as *Fabronia ciliaris* (Brid.) Brid., also contains approximately ten plants of *Z. apiculatus*.

Specimen examined: IOWA. Fremont Co. Waubonsie State Park. *H. S. Conard, s.n.*, 7 July, 1933 (IA).

The habitat of *Z. apiculatus* is reported as bark of hardwood trees in xeric oak-hickory climax forest (Crum & Anderson 1981; Vitt 1970). Conard's collection is similarly from hardwood tree bark, and Waubonsie State Park, in the Loess Hills physiographic region (Prior 1991), includes xeric oak woodlands.

According to Crum & Anderson (1981), Redfearn (1967), and Vitt (1970) distinctive features of *Z. apiculatus* include small plants, oblong-ovate and abruptly apiculate leaves terminated by a short concolorous cell, thin-walled upper leaf cells, and gemmae without longitudinal septae. All of these characteristics are present in plants from the Conard collection. However, in contrast to the well-developed and irregular serrations on the upper leaf margins illustrated in Crum & Anderson (1981), the leaf apices of the specimen examined are nearly entire. Apparently, this is a variable feature, since photomicrographs with Redfearn's (1967) original description show leaf apices, with few, rather poorly developed serrations, that are nearly identical to those in the Conard collection.

The taxonomic status of *Z. apiculatus* is not settled, despite recognition as a distinct species in Crum & Anderson (1981) and Anderson *et al.* (1990). According to Crum & Anderson (1981) and Vitt (1970), the taxon most closely related to *Z. apiculatus* is *Z. viridissimus* var. *rupestris* (Lindb.) ex Hartm. In fact, Vitt (1970) treated *Z. apiculatus* as a variety of *Z. viridissimus* (Dicks.) Brid., based on the supposition that the small size and serrulate upper leaf margins of *Z. apiculatus* "seem to be a direct result of the xeric habitat in which the plants grow". After consideration of Vitt's (1970) treatment, Crum & Anderson (1981) returned *Z. apiculatus* to specific rank, noting that "the species of

---

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Zygodon are so poorly distinguished and poorly understood that only a monographer should decide whether *Z. apiculatus* deserves specific or varietal rank, or no rank at all".

Acknowledgment. I thank Diana Horton for reviewing the manuscript.

Literature Cited

Anderson, L. E., H. A. Crum & W. R. Buck. 1990. List of the mosses of North America north of Mexico. *The Bryologist* 93: 448-499.

Crum, H. A. & L. E. Anderson. 1981. *Mosses of eastern North America.* Columbia Univ. Press. New York.

Prior, J. C. 1991. *Landforms of Iowa.* Univ. of Iowa Press. Iowa City.

Redfearn, P. L., Jr. 1967. Bryophytes of the Interior Highlands XII. A new species of *Zygodon*. *The Bryologist* 70: 333-335.

__________________. 1984. *Checklist of the mosses of the Interior Highlands of North America in Arkansas, Illinois, Missouri and Oklahoma.* Privately published by author, Southwest Missouri State Univ. Springfield.

Vitt, D. H. 1970. *The family Orthotrichaceae in North America, North of Mexico.* Ph.D. dissertation, Univ. of Michigan. Ann Arbor.

The World of Mosses Note Cards - Robert Muma

We have received with regret a note from Dorothy Muma saying that Robert Muma pass away last year. Mrs. Muma is willing to accept orders for the Note Cards and booklet *Guide to Mosses* by Robert Muma [see cover 3 Evansia 11(1) 1994 for announcement.] She asked however, that the orders be sent to her at 625 Rushton Rd., Toronto, Ontario, M6C 2Y8, Canada and, if a check is enclosed, it be made payable to Dorothy Muma (otherwise they can not be processed).

She also indicated that the extensive moss herbarium gathered by Mr. Muma will be housed at the Department of Botany, University of Toronto.

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I. The Broxton Rocks Ecological Preserve

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While the study of bryophytes on granite outcrops in the Southern United States has a history going back at least 60 years and has generated a considerable literature (cf. Whitehouse, 1933; Oosting & Anderson, 1937, 1939; McVaugh, 1943; Schornherst, 1945; Keever, Oosting & Anderson, 1951; Clebsch, 1954; Breen & Pursell, 1956), no such comparable history exists with regard to the study of bryophytes on sandstone exposures.

One of the most floristically diverse of the sandstone outcrops in the South Georgia-North Florida area is Broxton Rocks, located in northern Coffee County, approximately 9 miles NE of the town of Broxton. Although this site has been known to at least a few botanists since early this century (Harper, 1906a, b), long periods have passed in which little or no collecting of or publishing on the flora occurred. The discovery at this site of *Elliottia racemosa*, a rare ericad (Snow, 1985), corresponded to a resurgence of interest in the sandstone flora of south Georgia, and since the mid 1980s a few publications have appeared discussing rare or interesing vascular plants from Broxton Rocks (Bridges & Orzell, 1989; Matthews, Faircloth & Allison, 1991). No paper, however, has addressed the bryophytes or lichens of this unusual South Georgia habitat.

In 1992 The Nature Conservancy purchased 620 acres of Broxton Rocks, including Rocky Creek and its immediate watershed. The authors volunteered to survey the bryophytes on this property, now called the Broxton Rocks Ecological Preserve. The present paper reports on those species collected during three excursions (March, April & December) in 1993.

Much of the diversity of the Broxton Rocks flora can be attributed to the complex of micro-environments available (Holifield, 1989). The area lies generally within a longleaf pine-wire grass communtiy, an arid, open forest type of low bryophyte diversity, but within the highly dissected sandstone outcrop the number of niches increases dramatically. Habitats include shaded flood plains, permanent and seasonal streams, waterfalls, exposed boulders, flat and vertical rock ledges, narrow crevices, shallow caves and temporary rock pools. The Miocene-age sandstone belongs to the Altamaha Formation (Huddlestun, 1988), called by earlier authors the Altamaha Grit. It is of fluvial (nonmarine) origin.

The flora contains several vascular endemics or near endemic taxa. Among these are *Marshallia ramosa* and *Penstemon dissectus*. There is an even greater number of

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disjuncts such as *Portulaca biboba, Evolvulus sericeus, Delphinium carolinianum* and *Claytonia virginica*. In the disjunct category are the vascular cryptogams *Cheilanthes lanosa, Trichomanes petersii* and *Vittaria lineata*. Several species of *Selaginella* inhabit the sandstone outcrop not all of which have been confidently identified.

Among the Broxton Rocks bryophytes of special interest are *Brachymenium systylium,* a pantropical species, *Eccremidium floridanum,* previously known only from the Florida Panhandle, *Cephaloziella byssacea* and *Gymnocolea inflata,* both of boreal-north temperate distributions. None of these bryophyte taxa has been recorded previously from the coastal plain of Georgia.

The collections cited here are deposited at two herbaria, those of Buck (Nos. 24968-25090) at NY and those of Griffin and Snow (Nos. 1221-1677) at FLAS.

MOSSES
AMBLYSTEGIACEAE
Campylium chrysophyllum (Brid.) J. Lange, (1291).
Campylium cf. *radicale* (P.-Beauv.) Grout, (1322b).
ANOMODONTACEAE
Anomodon attenuatus (Hedw.) Hüb., (24999).
ARCHIDIACEAE
Archidium ohioense Schimp. *ex* C. Müll., (25081, 25088).
Archidium tenerrinum Mitt., (1366, 1381, 25084).
AULACOMNIACEAE
Aulacomnium heterostichum (Hedw.) B.S.G., (1676, 24972).
Aulacomnium palustre (Hedw.) Schwaegr., (1254, 1320).
BARTRAMIACEAE
Philonotis glaucescens (Hornsch.) Broth., (24992).
BRACHYTHECIACEAE
Bryoandersonia illecebra (Hedw.) Robins., (1226, 1623, 24977).
Steerecleus serrulatus (Hedw.) Robins., (1292, 1324, 1428, 1664, 25043, 25068).
BRUCHIACEAE
Bruchia flexuosa (Sw. *ex* Schwaegr.) C. Müll., (1361, 1365, 25076).
BRYACEAE
Brachymenium systylium (C. Müll.) Jaeg., (1658).
Bryum radiculosum Brid., (1499).
CALYMPERACEAE
Syrrhopodon texanus Sull., (1266, 1319, 25001, 25002).
CRYPHAEACEAE
Cryphaea glomerata B.S.G. *ex* Sull., (1314a, 1414).
Cryphaea nervosa (Drumm.) C.Müll., (25089).

Forsstroemia trichomitria (Hedw.) Lindb., (1425).

DICRANACEAE

Campylopus carolinae Grout, (1265, 1455, 25017, 25070).
Campylopus pilifer Brid., (1338, 1463, 1671, 25018).
Campylopus tallulensis Sull. & Lesq., (1310, 1415, 1500).
Dicranum condensatum Hedw., (1264, 1317, 1430, 25059).
Dicranum scoparium Hedw., (1269, 1355).
Dicranella heteromalla (Hedw.) Schimp., (1494, 1495, 1496).
Dicranella hilariana (Mont.) Mitt., (1497).

DITRICHACEAE

Ditrichum pallidum (Hedw.) Hampe, (1308, 1350, 1498).
Eccremidium floridanum Crum, (1621, 1667, 1675, 25027,25077, 25085, 25090).
Pleuridium subulatum (Hedw.) Rabenh., (1274, 1501).

ENTODONTACEAE

Entodon cladorrhizans (Hedw.) C. Müll., (25030)
Entodon macropodus (Hedw.) C. Müll.,(1284, 1289, 1342, 1625).
Entodon seductrix (Hedw.) C. Müll., (1345, 1380a, 1660, 25029).

EPHEMERACEAE

Ephemerum crassinervium (Schwaegr.) Hampe, (25080).

FABRONIACEAE

Anacamptodon splachnoides (Fröl. *ex* Brid.) Brid., (25016).
Clasmatodon parvulus (Hampe) Hook. & Wils. *ex* Sull., (1340, 1356, 1640, 24973, 24981, 25062).

FISSIDENTACEAE

Fissidens bushii (Card. & Thér.) Card., (1223, 1260, 1339, 1454).
Fissidens dubius P.-Beauv., (1237, 1624, 1633, 24968, 24997).
Fissidens ravenelii Sull., (1409, 1439, 1672, 24978, 25004, 25075).

FONTINALACEAE

Fontinalis novae-angliae Sull., (1419, 24991).

FUNARIACEAE

Entosthodon drummondii Sull., (1278, 1488, 1489).
Funaria flavicans Michx., (1222).
Funaria serrata Brid., (1502).

GRIMMIACEAE

Grimmia laevigata (Brid.) Brid., (1267a, 1352, 1642).

HEDWIGIACEAE

Hedwigia ciliata (Hedw.) P.-Beauv., (1250, 1643, 24983).

HYPNACEAE

Ctenidium molluscum (Hedw.) Mitt., (1288, 1631, 24971).
Isopterygium tenerum (Sw.) Mitt., (1318, 1336, 1619, 24989, 25048, 25079).
Platygyrium repens (Brid.) B.S.G., (1375)
Taxiphyllum taxirameum (Mitt.) Fleisch., (25033).

LEUCOBRYACEAE

Leucobryum albidum (Brid.) Lindb., (1263, 1304, 1659).

Leucobryum glaucum (Hedw.) (Ångstr., (1275, 1335).

LEUCODONTACEAE

Leucodon julaceus (Hedw.) Sull., (1635, 1645, 25505).

MNIACEAE

Plagiomnium affine (Bland. *ex* Funck) T. Kop., (1423).

Plagiomnium cuspidatum (Hedw.) T. Kop., (1379a, 1382a).

MYRINIACEAE

Schwetschkeopsis fabronia (Schwaegr.) Broth., (1385, 24975, 25053).

ORTHOTRICHACEAE

Schlotheimia rugifolia (Hook.) Schwaegr., (1234, 1253, 1410b, 24993, 25014).

POLYTRICHACEAE

Atrichum angustatum (Brid.) B.S.G., (1356, 1665, 25034).

Pogonatum brachyphyllum (Michx.) P.-Beauv., (1297, 1353).

Polytrichum commune Hedw., (1386).

Polytrichum commune var. *perigoniale* (Michx.) Hampe, (105, 1303, 1461, 24986, 25008, 25064).

POTTIACEAE

Tortella humilis (Hedw.) Jens., (1346, 25023).

Weissia controversa Hedw., (1354, 1464).

PTYCHOMITRIACEAE

Ptychomitrium incurvum (Schwaegr.) Spruce, (1329, 1456, 1637, 1648, 24997, 25012).

SEMATOPHYLLACEAE

Sematophyllum adnatum (Michx.) Britt., (1334, 1398, 1417, 1673, 24980, 25066).

Sematophyllum demissum (Wils.) Mitt., (1251, 1316, 1399a, 25069).

SPHAGNACEAE

Sphagnum affine Ren. & Card., (1227, 1403, 1473, 25003, 25036, 25063).

Sphagnum cyclophyllum Sull. & Lesq. *ex* Sull., (1246, 1268, 1277, 1307, 25055).

Sphagnum lescurii Sull., (1243, 1257, 1622, 24995, 25074, 25086).

Sphagnum perichaetiale Hampe, (1326, 1332, 1429).

Sphagnum recurvum P.-Beauv., (1424, 25082).

THELIACEAE

Thelia asprella Sull., (1374).

Thelia hirtella (Hedw.) Sull., (1426).

Thelia lescurii Sull., (25032).

THUIDIACEAE

Thuidium delicatulum (Hedw.) B.S.G., (1240, 1344, 1407).

HEPATICS

ADELANTHACEAE

Odontoschisma prostratum (Sw.) Trev., (1225, 1298, 1301, 1462).

ANEURACEAE

Riccardia multifida (L.) S.F. Gray, (1647).

CALYPOGEJACEAE

Calypogeja fissa (L.) Raddi, (1241a, 1270, 1327, 1493, 1651).
Calypogeja muelleriana (Schiffn.) K. Müll., (1442).
Calypogeja sullivantii Aust., (1450, 1484, 1638).

CEPHALOZIACEAE

Cephalozia bicuspidata (L.) Dumort., (1485a).
Cephalozia catenulata (Hüb.) Lindb., (1224, 1644).
Cephalozia connivens (Dicks.) Lindb., (1242a, 1420).

CEPHALOZIELLACEAE

Cephaloziella byssacea (Roth) Warnst., (1627).

DILAENACEAE

Pallavicinia lyellii (Hook.) S.F. Gray, (1418, 1460, 1487).

CODONIACEAE

Fossombronia brasiliensis Steph., (1367b, 1397).

JUBULACEAE

Frullania ericoides Mont., (1230a, 1314b, 1427, 1445a).
Frullania kunzei (Lehm. & Lindenb.) Lehm. & Lindenb., (1330, 1460, 1626).
Frullania obcordata (Lehm. & Lindenb.) Lehm. & Lindenb., (1396).

JUNGERMANNIACEAE

Gymnocolea inflata (Huds.) Dum., (1392, 1393, 1394).

LEJEUNEACEAE

Cheilolejeunea myriantha (Nees & Mont.) Schust., (1233a).
Cheilolejeunea rigidula (Nees & Mont.) Schust., (1244d, 1273b, 1652).
Lejeunea flava (Sw.) Nees, (1233b, 1256, 1331a, 1480).
Lejeunea laetevirens Nees & Mont., (1230b, 1258c, 1677).
Lejeunea ulicina (Tayl.) Tayl, (1434).
Leucolejeunea clypeata (Schwein.) Evans, (1229, 1252, 1311, 1472, 1639).
Leucolejeunea conchifolia Evans, (1395).
Leucolejeunea unciloba (Lindenb.) Evans, (1341, 1401a).
Mastigolejeunea auriculata (Wils. & Hook.) Schiffn., (1383a).
Rectolejeunea maxonii Evans, (1244b, 1331c, 1479, 1662).

LEPIDOZIACEAE

Kurzia sylvatica (Evans) Grolle, (1328, 1405, 1437)
Telaranea nematodes (Gott.) Howe, (1450a, 1458b).

LOPHOCOLEACEAE

Chiloscyphus polyanthus (L.) Corda, (1238).

METGERIACEAE
Metzgeria furcata (L.) Dum., (1293).
PLAGIOCHILACEAE
Plagiochila dubia Lindenb. & Gott., (1244c, 1379b, 1382b, 1486).
Plagiochila ludoviciana Sull., (1481).
Plagiochila undata Sull, (1244a, 1279b, 1337, 1343).
PORELLACEAE
Porella pinnata L. (1245, 1280, 1358).
REBOULIACEA
Reboulia hemisphaerica (L.) Raddi, (1221, 1285, 1630).
RICCIACEAE
Riccia sorocarpa Bisch., (1367a).
SCAPANIACEAE
Scapania undulata (L.) Dum., (1241b, 1262b, 1411).
ANTHOCEROTACEAE
Anthoceros laevis subsp. *carolinianus* (L.) Schust., (1422).

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Literature Cited

Breen, R.S. & R.A. Pursell. 1956. More mosses from Stone Mountain, Georgia and vicinity. *Bryologist* 59: 184-186

Bridges, E.L. & S.L. Orzell. 1989. *Evolvulus sericeus* (Convolvulaceae) in Georgia with floristic and ecological notes. *Sida* 13(4): 509-511.

Clebsch, A. 1954. Bryological note on Stone Mountain, Georgia. *Bryologist* 57:20.

Harper, R.M. 1906a. Phytogeographical sketch of the Altamaha Grit region of the the coastal plain of Georgia. *Annals New York Acad. Sci.* 17:1-357.

_________. 1906b. Some hitherto undescribed sandstone outcrops of Altamaha Grit and their vegetation. *Torreya* 6: 241-246.

Holifield, V. 1989. True Grit: Georgia's other outcrops. *Tipularia* 4(1): 2-8.

Huddlestun, P.F. 1988. A revision of the lithostratigraphic units of the coastal plain of Georgia, the Miocene through the Holocene. *Georgia Geol. Surv. Bull.* 104: 100-107.

Keever, C., H.J. Oosting & L.E. Anderson. 1951. Plant succession on exposed granite of Rocky Face Mountain, Alexander County, North Carolina. *Bull. Torrey Bot. Club* 78: 401-421.

Matthews, J.F., W.R. Faircloth & J.R. Allison. 1991. *Portulaca biloba* Urban (Portulacaceae), a species new to the United States. *Syst. Bot.* 16:736-740.

McVaugh, R. 1943. The vegetation of the granite flat-rocks of the Southeastern United States. *Ecol. Monogr.* 13: 120-166.

Oosting, H.J. & L.E. Anderson. 1937. The vegetation of a barefaced cliff in Western North Carolina. *Ecology* 18: 280-292.

______________________________. 1939. Plant succession on granite rock in Eastern North Carolina. *Bot. Gaz.* 100: 750-768.

Schornherst, R.O. 1945. Moses of Stone Mountain, Georgia. *Bryologist* 48: 29-33.

_______________. 1946. The mosses of Georgia-II. The coastal plain. *Bull. Torrey Bot. Club* 73: 155-166.

Snow, F. 1985. [Abstr.] *Elliottia* in the Ocumlgee Big Bend region of South Georgia. *Georgia J. Sci.* 43: 11.

Whitehouse, E. 1933. Plant succession on Central Texas granite. *Ecology* 14: 391-405.

"*Herpothallon sanguineum*" in Delaware: a reevaluation

Irwin M. Brodo[1]

Many years ago, I reported the presence of *"Herpothallon sanguineum"* (= *Cryptothecia rubrocincta* (Ehrenb.) Thor; [Thor 1991]) from Trap Pond State Pond in southern Delaware (Brodo 1968). Having received an inquiry regarding that species in Delaware from Lance Biechele, I reexamined my specimen and was disappointed to find that I had misdetermined it. It is, in fact, a sterile specimen of *Pertusaria paratuberculifera* Dibben parasiting by what appears to be the granular, coral-colored parasite, *Illosporium corallinum* Roberge in Desm. Thus, to my knowledge, *Cryptothecia rubrocinta* is not found in Delaware, and the distribution maps published by Culberson (1964) and Thor (1991) accurately portray the northern limit of the lichen to be coastal North Carolina.

Acknowledgement. I thank Lance Biechele for drawing my attention to this problem, while keeping me well-supplied with excellent lichen specimens from the Delmarva Peninsula.

Literature Cited

Brodo, I.M. 1968. *Herpothallon sanguineum* (Sw.) Tobl. and some associated lichens from southern Delaware. *The Bryologist* 71: 120-121.

Culberson, W.L. 1964. The range of *Herpothallon sanguineum* in the United States. *Bryologist* 67: 224-226.

Thor, G. 1991. The placement of *Chiodecton sanguineum* (syn. *Chiodecton rubrocinctum*), and *Cryptothecia striata* sp. nov. *The Bryologist* 94: 278-283.

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The genus *Blindia* (Musci: Seligeriaceae) in Maine

Bruce Allen[1]

The Seligeriaceae are small, acrocarpous mosses with a distinctive peristome type. Their 16 peristome teeth are more thickened on the outer (dorsal) than the inner (ventral) surface and pre-peristomial deposition occurs as a thin membrane or basal prostome. The peristome is small and its cellular pattern is often difficult to see, but it has the typical 2:3 haplolepideous pattern.

Edwards (1979) drew special attention to the seligerioid peristome as did Vitt (1984) in erecting the suborder Seligeriineae. But, the peristome type is not unique in the haplolepideous mosses. For example, *Dicranoweisia* (Edwards 1979), *Grimmia* (Churchill 1981) and *Schistidium* (Edwards 1979) have similarly thickened peristome teeth and the peristome in *Racomitrium* often has pre-peristomial depositions (Allen 1994). The relative thickness of the cell wall remnants in a peristome is one factor that determines the strength and direction of its motion on wetting or drying. Different patterns of hygroscopic motion presumably affect the timing of spore dispersal (Shaw & Robinson 1984). The reduced size of the seligerioid peristome and its distinctive type of thickening may be associated with a pattern of spore dispersal that has adaptive significance. This type of peristome appears to have arisen independently in a number of groups.

The gametophytes in the Seligeriaceae are also unusual because their leaves lack internal costal differentiation. This distinctive feature occurs sporadically throughout the haplolepideous mosses, and is found in the closely related Dicranaceae (*Kiaeria* and *Arctoa*). In fact, all of the unusual gametophytic and sporophytic features of the Seligeriaceae occur in the Dicranaceae; however, the combination of a seligerioid peristome and homogeneous internal costal cells sets the group apart. Whether the group should be recognized as a distinct family or subfamily within the Dicranaceae (Dixon 1932) is open to question. Recognition of the group at the suborder level is unwarranted.

There are three genera in the Seligeriaceae, *Brachydontium*, *Blindia*, and *Seligeria*, but only *Blindia* has been collected in Maine. *Dicranoweisia*, sometimes placed in the family because of its similar pattern of peristomial thickening (Ochyra 1993), has heterogeneous costal elements and is better placed in the Dicranaceae (see Reimers 1936, Van Zanten 1971).

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SELIGERIACEAE

Plants small, gregarious or tufted, erect, simple or sparsely and irregularly branched, not tomentose. Leaves subulate-acuminate from a narrow base; costa single, strong, excurrent or percurrent, in cross-section consisting of homogeneous cells; cells smooth, alar cells well-developed or not differentiated. Dioicous or autoicous. Setae erect or curved-cygneous; capsules erect, stomata present; annulus large, compound or simple; opercula rostrate, straight or oblique; peristome absent or of 16 truncate or lanceolate teeth more thickened on the outer (dorsal) than the inner (ventral) surface often with pre-peristomial deposition. Calyptrae mitrate or cucullate.

Blindia B.S.G., Bry. Eur. 2: 17. 1846.

Plants glossy, brown to yellow-green, caespitose. Leaves lanceolate, erect-spreading to secund; costa strong, excurrent; cells incrassate, upper cells short, basal cells linear, alar cells well-developed, inflated, red-brown. Dioicous. Setae erect; annulus simple; peristome teeth 16, lanceolate; calyptra cucullate.

Blindia has 16 species that are found principally in the northern and southern Temperate Zones (see Bartlett and Vitt 1986). The genus typically occurs on wet, acidic rocks.

Brachydontium and *Seligeria* both occur nearby. *Brachydontium trichodes* (Web.) Milde, reported from New Hampshire (Crum and Anderson 1981), is autoicous, has a mitrate calyptra, and undifferentiated alar cells. Five species of *Seligeria* are known New Brunswick or southern Quebec. It too is autoicous, most of its species lack differentiated alar cells, and it is restricted to calcareous substrates.

In its larger plant size and well developed alar cells *Blindia* seems more dicranaceous than seligeriaceous. But, its peristome type and homogeneous internal costal cells place it in the Seligeriaceae. Actually, *Seligeria* and *Blindia* are closely linked by subgenus *Blindiadelphus*. The species in this subgenus resemble *Blindia* in size and in having thin-walled, differentiated alar cells, but like *Seligeria* they are autoicous calciphiles. Subgenus *Blindiadelphus* is sometimes placed in *Seligeria* (see Vitt 1976) and other times referred to *Blindia* (Hagen 1910).

Blindia acuta (Hedw.) B.S.G., Bryol. Eur. 2: 19. 1846.
Weissia acuta Hedw., Spec. Musc. 71. 1801.

Stems slender, erect to sub-erect, 1--4 cm long, central strand present. Leaves erect to erect-spreading or secund, evenly spaced, lanceolate, 1.5--2.3 mm long, apex abruptly long-subulate; margins entire below, entire, sub-entire or denticulate above, erect or incurved; costae single, long-excurrent, in transverse section with only stereid cells; cells smooth and incrassate throughout, upper cells short and irregularly rectangular 10--30 μm,

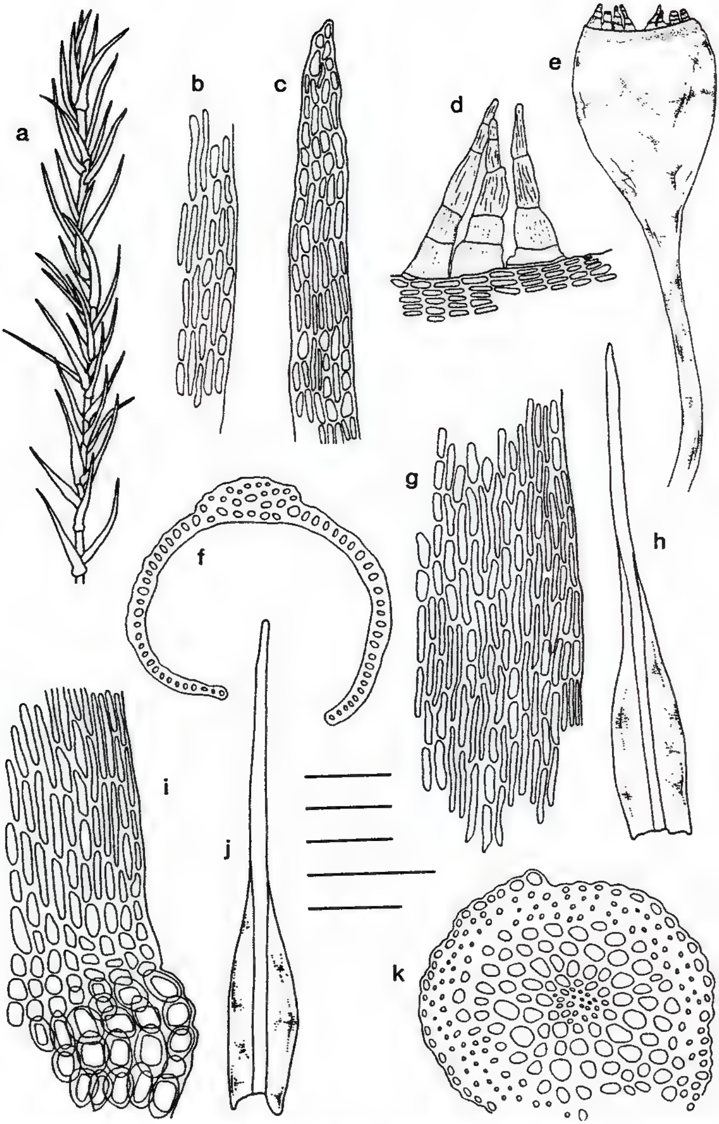

Figure 1. *Blindia acuta*. a. Habit. b. Upper leaf margin c. Leaf apex. d. Peristome teeth, dorsal (outer) surface. e. Capsule and seta. f. Cross-section through median part of leaf. g. Median leaf cells and leaf margin. h. Leaf. i. Lower leaf cells and alar cells. j. Leaf. k. Stem cross-scetion. Scales in mm: top = 0.05 (b,c,f,g,i,k); subtop = 0.1 (d); middle = 0.5 (e); subbottom = 0.5 (h,j) bottom = 2.0 (a).

basal cells linear, 20--50 µm long, alar regions with distinct groups of dark, abruptly inflated, thin-walled, reddish-brown cells. Sporophytes not seen from Maine. [Setae 3--11 mm long, straight or flexuose-curved above; capsules 1 mm long, ovate to obovoid, pyriform and constricted below the mouth when dry and empty; peristome teeth lanceolate, acute, entire or more or less split at the tip, dark-red or red-brown; opercula obliquely conic rostrate. Spores 10--18 µm, minutely papillose. Sporophyte description taken from Washington and New York material.]

On boulders and rocks in lakes, along streams or in seepy areas. In Maine known from Androscoggin (*Allen 14695* MO), Hancock (*Allen 3756* MO), Knox (*Allen 14635* MO), and Oxford (*Parlin 11695* MAINE) counties.

Blindia acuta can be found in seepy habitats or submerged in lakes, ponds or streams. It resembles *Dicranella* or *Ditrichum* in aspect, but those genera have undifferentiated alar cells, internal costal differentiation and dicranoid peristomes. Homogeneous costal cells and differentiated alar cells are encountered in *Arctoa fulvella* or *Kiaeria blytti* and both species are found in Maine. They differ from *Blindia* in their autoicous condition and dicranoid peristomes.

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Literature Cited

Allen, B. 1994. The Grimmiaceae (Musci) in Maine. III. *Racomitrium*. Evansia 11: 41-54.

Bartlett, J. K. & D. H. Vitt. 1986. A survey of species in the genus *Blindia* (Bryopsida, Seligeriaceae). New Zealand J. Bot. 24: 203-246.

Churchill, S. P. 1981. A phylogenetic analysis, classification and synopsis of the genera of the Grimmiaceae (Musci), pp. 127-144. *In* V. A. Funk & D. R. Brooks (eds.), Advances in Cladistics. New York.

Crum, H. A. & L. E. Anderson. 1981. Mosses of Eastern North America. Volume 1. 663 pp. Columbia University Press. New York.

Dixon, H. N. 1932. Classification of mosses, pp. 396-412. *In*. F. Verdoorn (ed.), Manual of Bryology. Martinus Nijhoff, The Hague.

Edwards, S. R. 1979. Taxonomic implications of cell pattern in haplolepidous moss peristomes, pp. 317-346. *In* G. C. S. Clarke & J. G. Duckett (eds.), Bryophyte Systematics, Systematics Association Special Volume 14. Academic Press, London and New York.

Hagen, I. 1910. Forarbejder til en norsk løvmosflora. XIII-XVIII. Kongl. Norske Vidensk. Selsk. Skr. 1910(1): 1-108.

Ochyra, R. 1993. Antipodal mosses: I. A revision of the genus *Holodontium* (Seligeriaceae). Fragm. Flor. Geobot. 38: 75-98.

Reimers H. 1936. Über die Laubmoosgattungen *Bryoporteria* Thér., *Camptodontium* Dus., *Hymenoloma* Dus., *Verrucidens* Card. und ihre systematische Stellung. Notizbl. Bot. Gart. Berlin-Dahlem 13(116): 36-52.

Shaw, J. & H. Robinson. 1984. On the development, evolution, and function of peristomes in mosses. J. Hattori Bot. Lab. 57: 319-335.

Van Zanten, B. O. 1971. Musci, pp. 173-227. *In*: E. M. van Zinderen Bakker, J. M. Winterbottom & R. A. Dyer (eds.), Marion and Prince Edward Islands. A. A. Balkema, Cape Town.

Vitt. D. H. 1976. The genus *Seligeria* in North America. Lindbergia 3: 241-275.

_____. 1984. Classification of the Bryopsida, pp. 696-759. *In* R. M. Schuster (ed.) New Manual of Bryology. Hattori Botanical Laboratory, Nichinan.

Should mosses have common names?
Part 11. The Common Names of Hookeriales and Tetraphidales

Janice M. Glime[1]

These two orders are not related, but both are small orders and their members lack useful properties that make them attractive to people who use mosses. Hence, the common names refer to distinctive characters in the appearance of the mosses, not to their uses.

Hookeria has large, somewhat transparent, shiny leaves, earning it the name of oily moss. The name of net moss and its generic name of *Cyclodictyon*, also in the Hookeriaceae, refer to the large transparent cells that give a net-like appearance.
Tetraphis is named primarily for its four teeth, but I like the name of ant spear moss, named for its very straight seta topped with an elongate, cylindrical, pointed capsule; presumably pin moss refers to the same characteristic in *Tetrodontium*, but this moss is much smaller. Since *Tetraphis* is the only moss that has gemmae cups, it is surprising that I have found no name that refers to them.

Conventions in formatting follow Glime (1989). The meaning of the scientific name, as supplied by Elizabeth Dunham, is provided immediately after the scientific name. Any structure to which the name applies is in parentheses. Nomenclature follows Anderson, et al. (1990).

Callicostellaceae
Callicostella (C. Müll.) Mitt.: rib moss[14]
Callicostella pallida (Hornsch.) Ångstr.: strong rib moss[14]

Hookeriaceae
Cyclodictyon Mitt.: rounded-net moss[14]
Hookeria sm.: oil moss[13]; oily-glossy moss[14]; hookeria
Hookeria acutifolia Hook. & Grev.: oil moss[13]; pointed-leaf oily-glossy moss[14]
Hookeria lucens (Hedw.) Sm.: shining hookeria[6, 8, 11, 20]; clear moss[25]
Trachyxiphium Buck: hookeria-like moss[14]

Tetraphidaceae
Tetraphis Hedw.: georgia1; four-toothed mosses[4,6]; tetraphis[18]; four-toothed moss[13]; four-toothed moss[14]
Tetraphis geniculata Girg. ex Milde: ant-spear moss[13]

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Tetraphis pellucida Hedw.: four-tooth moss[3]; pellucid tetraphis[8]; pellucid four-tooth moss[11,20]; four-toothed moss[13, 25]; common four-toothed moss[14]

Tetrodontium Schwaegr.: four-toothed mosses[4]; small four-toothed moss[13]; pin moss[25]

Tetrodontium brownianum (Dicks.) Schwaegr.: Mr. Brown's tetraphis[8]; Mr. Brown's moss[11]

Tetrodontium repandum (Funck in Sturm) Schwaegr.: small four-toothed moss[13]; black pin moss[25]

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[1] Grout, A. J. 1900. Mosses with a hand-lens. Press of Binghampton Republican, New York, 74 Pp.; Grout, A. J. 1903. Mosses with a handlens and microscope. By Author. N. Y.

[3] Shuttleworth, F. S. and H. S. Zim. 1967. Non-flowering plants. Ferns, mosses, lichens, mushrooms and other fungi. A Golden Nature Guide, Golden Press, N.Y. 160 Pp.

[4] Marshall, N. L. 1907. Mosses and lichens. Doubleday, Page, & Co., N. Y. 327 Pp.

[6] Welch, W. H. 1957. Mosses of Indiana. An illustrated manual. The Bookwalter Company, Indianapolis. 478 Pp.

[8] Stark, R. M. 1860. A popular history of British mosses, 2nd edition. Routledge, Warne, & Routledge, London (Wheldon & Wesley), 348 Pp.

[11] Tripp, F. E. 1888. British mosses, their homes, aspects, structure and uses. George Bell & Sons, Covent Garden, London (Wheldon & Wesley), 2 Vol.

[13] Zen Iwatsuki (personal communication)

[14] Jinkun Zhang (personal communication, translated from Wu et al. 1984)

[20] Russell, T. H. 1910. Mosses and liverworts. An introduction to their study, with hints as to their collection and preservation. Sampson Low, Marston & Co., LD. 211 Pp., 10 plates.

[25] Hallinbäck, T. and L. Söderström. 1987. Sveriges mossor och deras svenska namm -- en kommenterad checklista. [The bryophytes of Sweden, an annotated checklist with common names.] Svensk Bot. Tidskr. 81: 357-388.

Literature Cited

Anderson, L. E., Crum, H. A. and Buck, W. R. 1990. List of the mosses of North America North of Mexico. *Bryologist* 93: 448-499.

Glime, J. M. 1989. Should mosses have common names? *Evansia* 6(1):1-6.

A contribution to the differentiation of *Campylopus subulatus* and *C. tallulensis* in North America

Jan-Peter Frahm[1]

Some time ago I got a *Campylopus* specimen (Anderson 26656) for identification from the herbarium of the Duke university, which was collected in Mississippi in 1992. Apparently there were doubts about the identity of this specimen. According to the xerox copy of a letter which accompanied the specimen, it was previously sent to Bruce Allen. Allen was not sure about its identity but remarked that the Anderson specimen is the same as a specimen he and Paul Redfearn had collected in 1985 in Arkansas, which I called *Campylopus tallulensis* Sull. & Lesq., "and this is what he will call your plant". And this was true since the questionable specimen matches perfectly the description of *C. tallulensis* in Crum & Anderson (1981). Typically *C. tallulensis* has subquadrate upper laminal cells, hyaline, thin walled basal laminal cells, and a transverse section of the costa with ventral hyalocysts and dorsal groups of stereids. There are more subtile characters typical for *C. tallulensis*, such as the back of the costa which is roughened like a rats tail file (observed by Anderson in his description in Crum & Anderson 1981), the excurrent costa is often excurrent in a subhyaline point and the leaf apex is distinctly canaliculate. When the leaves are stripped off the stem, the cortex of the stem remains at the base of the leaves. The problem with the specimens from Mississippi and Arkansas, however, is these plants are dark green and slender, whereas plants from Georgia, the Carolinas and also from Mexico are very robust and always yellowish green to even golden yellowish. The difference in habit also confused me, but for a special reason. The green plants from the Interior of North America resemble *Campylopus subulatus* Schimp. in all anatomical respects and in the characters described above for *C. tallulensis. Campylopus subulatus* was recorded as new to North America from California (Frahm 1980). In my experience, the only way to distinguish these species was by their different transverse section of the costa, there are distinct groups of dorsal stereids in *C. tallulensis* (figs. 1-3) but no dorsal stereids in *C. subulatus* (figs. 4-5). This distinction is not only difficult to observe but it is also questionable whether two species can be separated by such a character alone. Some of the green specimens of *C. tallulensis* were difficult to interpret. Apparently there is some variation in the width of the dorsal stereids (perhaps in humid habitats) and thus intergradations to *C. subulatus* in this character, e.g. in *Anderson 26656* (fig. 3). Therefore all material of *C. tallulensis* and *C. subulatus* in my herbarium was carefully re-examined. During this study, it turned out that the width of the ventral hyalocysts differs in both species. This is not as obvious in transverse sections as it is in surface view on the ventral side of the costa (figs. 6-7). In *C. subulatus*, the ventral hyalocysts

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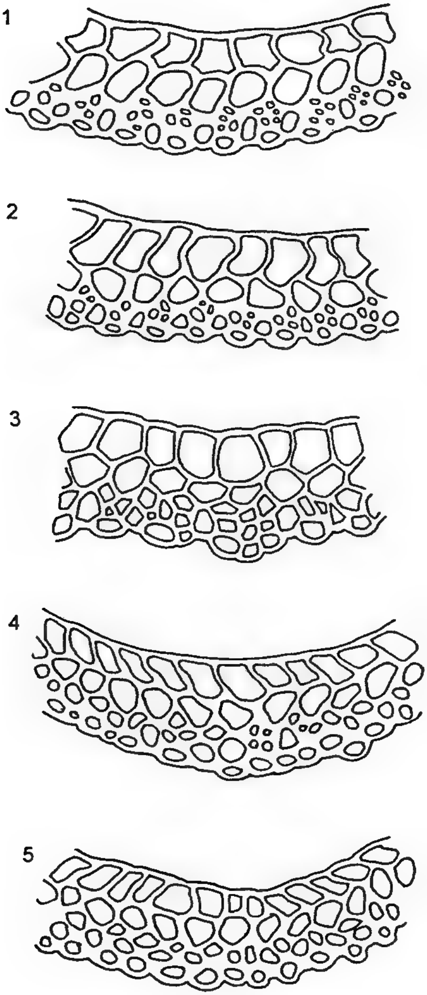


Figs. 1-5: Parts of transverse sections of the costae of *Campylopus tallulensis* (1-3) and *C. subulatus* (4-5). 1. *Allen 6305* (Arkansas), 2. *Frahm 23.2.79* (Mexico), 3. *Anderson 26656* (Mississippi), 4. *Philippi 1977 s.n.* (Germany), *Norris 52767* (California).

are 5-8 µm wide and hardly conspicuous, in *C. tallulensis*, they are more than twice as wide (12-18 µm) and conspicuously leucobryoid in appearence. This character also allows one to identify dark green plants with relatively wide dorsal stereids as *C. tallulensis*.

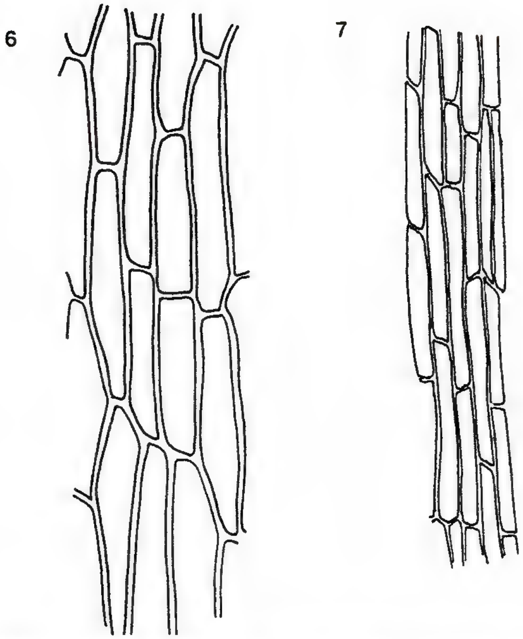
The re-examination of specimens of *C. subulatus* and *C. tallulensis* from North America revealed no changes in the known ranges of both specimens. There is true *C. subulatus* in California and all specimens from the Interior of North America belong to *C. tallulensis* in spite of their different color and different appearence.

A mapping of all specimens of *C. tallulensis* in my herbarium revealed that specimens from Illinois and Arkansas are dark green but those from North Carolina, Georgia and Louisiana are yellowish. Specimens from Mississippi were in part green (from sandstone), in part yellowish (from alluvial habitats near the coast). These differences in color could be the result of a different geological substrate (mosses are often yellowish in nutrient poor habitats such as plutonic rocks or bark of some trees) or could indicate different isolated populations (the ranges of *C. tallulensis* in North America indicate pleistocene refugia).

The similarity between *C. tallulensis* and *C. subulatus* indicates a close relationship between the species. Typically for the genus, speciation takes places by modifying structures of the costa. There are many examples in the genus *Campylopus* for species pairs which are identical in leaf characters but differ in the structure of the costa. In the examples known so far, the differences concerned the presence of ventral hyalocysts or stereids. *Campylopus subulatus - tallulensis* is an example for lack or presence of dorsal stereids. The presence of stereids is interpreted as an adaptation to better drought resistance. The close relationship between *C. subulatus* and *C. tallulensis* may also indicate a close phylogenetical relationship.

Campylopus subulatus is one of the few species of the genus that is holarctic in distribution (as are *C. schimperi, C. atrovirens* and *C. schwarzii*). The other species of *Campylopus* that occur throughout the temperate regions of the northern hemisphere are tropical montane (*C. pilifer, C. fragilis, C. flexuosus*). *Campylopus subulatus* was described from Europe by Schimper based on a specimen collected by Milde in northern Italy in 1861 and was known only from Europe until 15 years ago. Then it was recorded from California (Frahm 1980), India (Frahm 1982), Yunnan (Frahm 1984) and East Asia, where it was previously described as *C. gracilis* (Frahm 1992). The species is widespread but very scattered in western Europe. It grows on rocks and soil in relatively dry forests.

A typical habitat for this species in Central Europe seems to be unpaved forest roads, on which the species grows in the middle amongst grasses. This seems to indicate that *C. subulatus* has only a few natural habitats in dry forests, which were more widespread in drier and warmer periods of the Holocene, and that it is able to survive only in these relic habitats as well as occasionally to spread vegetatively to secondary habitats.



Figs. 6-7: Ventral views upon the costa of 6. *Campylopus tallulensis* (*Reese 9358*, Louisiana) and 7. *C. subulatus* (*Philippi 1977* s.n., Germany).

Sporophytes are extremely rare. The plants are usually very small (this concerns also the type specimen) and seem under developed, which is another indication that the species does not grow under optimal climatic conditions at present. Its isolated occurrence in California so far lacks any explanation.

Campylopus tallulensis is known in North America from Delaware, Virginia, North and South Carolina, Tennessee, Georgia, Arkansas, Alabama, Louisiana, Mississippi, Ohio and Illinois. It is also quite frequent in Mexico. From Central and South America, it is only known from scattered records in Nicaragua, Colombia, Venezuela, Peru and Bolivia (Frahm 1991). It can be supposed that *C. tallulensis* has originated in North America, perhaps as a vicariant species of *C. subulatus*, with which it shares most characters and its habitat. The habitat in pine and oak forests indicates an origin in relatively dry climatic periods. The species persisted perhaps in the Pleistocene in North America in two separate refugia, the Ozarks and the southern Appalachians, which may explain the presence of two populations of different appearence today. *Campylopus tallulensis* has never been found with sporophytes. Except for the color, there is some variation in the length of the plants (0.5 - 5 cm) and the length of the leaf apex. In stunted forms, the upper laminal cells reach far down the leaf and the basal laminal cells tend to be short and subquadrate. Such plants lead to the inclusion of *Campylopus zygodonticarpus* in the most recent checklist of the mosses of North America (Anderson et al. 1990).

Specimens of *Campylopus tallulensis* examined: ALABAMA, Buck's Pocket State Park, on dry soil over rock, *Bowers 14483* (hb. Frahm). ARKANSAS, Johnson Co., Haw Creek Falls, on sandstone ledge, *Redfearn et al. 33560* (hb. Frahm); Izard Co., Calico Rock, dry sandstone outcropping above White River, *Allen 6305* (MO, hb. Frahm); Newton Co., Alum Cave Natural Bridge, on vertical sandstone bluff, *Redfearn et al. 33527* (hb. Frahm); Washington Co., on soil in woods 1-2 miles East of Springdale, *Anderson 12268 sub C. flexuosus*. DELAWARE, Sussex Co., eastern edge of Trap Pond ca 1 mi. S of Whaleys Crossroads, on sandy soil along road side, *Allen 8346* (MO, hb. Frahm). GEORGIA, Stone Mountain E of Atlanta, on granite rocks, *Campylopodes Exsiccatae 25, Frahm 803195, 803219* (hb. Frahm). ILLINOIS, Saline Co., Shawnee National Forest, Garden of Gods, Pennsylvania sandstone cliffs, on top of boulder, *Allen 6154* (MO, hb. Frahm). LOUISIANA, Sabine Co., 4 miles NW of Hornbeck, Sandstone outcrops forming a N-facing cliff, *Reese 9358* det. Frahm (LAF, hb. Frahm); Hodges Gardens, ca. 12 mi S of Many, on rocks in pine forest, *Reese 9371* det. Frahm (LAF, hb. Frahm); Jackson Co., Mississippi Sandhill Crane National Wildlife Refuge, tree base in flatwoods. *Reese 13912* det. Frahm (LAF, Hb. Frahm). MISSISSIPPI, Scott Co., Caney Creek Wildlife Management Area along FS road 518, 1 mi E of Co. road 501; Bienville National Forest, mixed pine-hardwood forest, on rock, *Anderson 26,656* det. Frahm (DUKE, hb. Frahm). North Carolina, Wake Co., 7.6 mi N of Zebulon, rocky outcrops, *Campylopodes Exsiccatae 29 , Frahm 803048* (hb. Frahm). Transsylvania Co., Toxaway River Falls, *Frahm 803010* (hb. Frahm).

Literature Cited

Anderson, L.E., Crum, H.A., Buck, W.R. 1990. List of the Mosses of North America North of Mexico. The Bryologist 93: 448-499.

Crum, H.A., Anderson, L.E. 1981. Mosses of Eastern North America. New York.

Frahm, J.-P. 1980. Synopsis of the Genus *Campylopus* in North America North of Mexico. The Bryologist 83: 570-588.

Frahm, J.-P. 1982. Taxonomische Notizen zur Gattung Campylopus XII. Cryptogamie, Bryol. Lichénol. 3: 59-66.

Frahm, J.-P. 1984. Phytogeography of European *Campylopuis* species. Proc. Third Meeting of Bryologists from Central and east Europe, Praha 1982, p. 191-212.

Frahm, J.-P. 1991. Campylopodioideae, Paraleucobryoideae. Flora Neotropica Monograph 54.. 238 pp.

Frahm, J.-P. 1992. A Revision of the east-Asian Species of *Campylopus*. J. Hattori Bot. Lab. 71: 133-164.

Additions to the lichen flora of North America III. *Halecania viridescens* and *Opegrapha sorediifera.*

Tor Tønsberg[1]

Abstract. Halecania viridescens *and* Opegrapha sorediifera *are reported new to North America from Olympic Peninsula, Washington.*

During a field trip in 1993 to the Olympic Peninsula in Washington on the Pacific coast of USA, I collected material of the corticolous species *Halecania viridescens* and *Opegrapha sorediifera*. These species are believed to be new to North America as they are not listed by Egan (1987), in the recent changes to his checklist (Egan 1989, 1990, 1991) or as far as I know, in any other paper dealing with North American lichens. The species were found on one mature, leaning trunk of *Alnus rubra* in an open *A. rubra* thicket bordering a wetland c. 1 km off the Pacific shore line. The trunks were well-lit as the surrounding vegetation was suppressed due to browsing by cattle. Among the lichens on the trunk were several oceanic or humidity demanding species, e.g. the western North America endemic *Coccotrema pocillarium*, and the much more widespread *Menegazzia terebrata* (fertile!).

The locality: **USA. Washington**. Clallam County: SW of village Neah Bay along road to Waatch, NW of river Waatch c. 1 km from Mukkaw Bay. Altitude: 0-5 m. 14 October 1993.

Halecania viridescens Coppins & P. James

Within the genus *Halecania*, this species is characterized by its minute, punctiform, dark green soralia containing argopsin and gracilenta unknown 1 (see Tønsberg 1992), the corticolous habit, and when fertile, by the small apothecia with sorediate thalline margin. For further details, see Coppins (1992). The North American collection was fertile and corresponded well morphologically and chemically with European material including the type specimen from Scotland. With the specimen from Washington, *Halecania viridescens* shows a northwest Europe (see Coppins 1992), northwest North America disjunct distribution.

Specimen seen: *Tønsberg 19349* (BG).

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Opegrapha sorediifera P. James

This species is easily distinguished by the orange-yellow (when fresh!), more or less punctiform, 0.4 - 1.2 mm wide soralia containing gyrophoric acid. For further details, see Pentecost and James (1992). The North American material was in accordance with European material examined for comparison. Apothecia were not observed. The specimen grew on the under-side of the trunk and was protected from direct sun. With the specimen cited here, the species shows a northwest Europe (see Pentecost & James 1992), northwest North America disjunct distribution.

Specimen seen: *Tønsberg 19348* (CANL, DUKE, BG, WTU).

Literature Cited

Coppins, B. J. 1992. *Halecania* M. Mayrh. (1987). In: Purvis, O. W., Coppins, B. J., Hawksworth, D. L., James, P. W. & Moore, D. M. (eds), *The lichen flora of Great Britain and Ireland.* Natural History Museum Publications/The British Lichen Society, London.

Egan, R. S. 1987. A fifth checklist of the lichen-forming, lichenicolous and allied fungi of the continental United States and Canada. *The Bryologist* 90: 77–173.

Egan, R. S. 1989, 1990, 1991. Changes to the "Fifth checklist of the lichen-forming, lichenicolous and allied fungi of the continental United States and Canada." Edition I-III. *The Bryologist* 92: 68-72; 93: 211-219; 94: 396-400.

Pentecost, A. & James, P. W. 1992. *Opegrapha* Humb. (1793). In: Purvis, O. W., Coppins, B. J., Hawksworth, D. L., James, P. W. & Moore, D. M. (eds), *The lichen flora of Great Britain and Ireland.* Natural History Museum Publications/The British Lichen Society, London.

Tønsberg, T. 1992. The sorediate and isidiate, corticolous, crustose lichens in Norway. *Sommerfeltia* 14: 1-331.

Should mosses have common names?
Part 12. The Common Names of Hypnales

Janice M. Glime[1]

For North Americans, there are a lot of familiar mosses hiding under unfamiliar revised generic names in this group, and the reader might benefit from comparing these to the list of synonyms in Anderson, *et al.* (1990).

Colorful common names abound in this Hypnales. I like descriptive names like paint brush moss for *Acroporium* or spoon moss for *Calliergon.* Spaced-out moss seems appropriate for *Campylium*, provided you know it refers to the wide-spreading leaves. Stair step moss appropriately describes the yearly increments of branch layers in *Hylocomium splendens.* Big red stem aptly describes *Pleurozium schreberi*, but will not separate it from some of its look-alikes in *Hylocomium.* Peacock moss is an appropriate name for the beautiful flat, spreading branches of *Hypopterygium.* Tufa moss describes the ability of *Cratoneuron* to accumulate calcium carbonate and build a tufa rock, but I must plead ignorance on its name of shaguma moss, referring to a Japanese wooden tool for fixing hair, since I have never been introduced to this instrument.

Of course *Hygrohypnum* is named brook moss for its habitat, but so is *Fontinalis.* Other common name confusions include the many thread mosses and feather mosses. There are far too many silk mosses: *Brachythecium, Pseudoscleropodium, Pylaisiella, Entodon, Bryohaplocladium, Plagiothecium*, and *Rauiella* in this order alone. It is therefore fitting that I conclude this series of moss common names by encouraging the reader to use them with caution and to learn the scientific names for the mosses, using the common names only as tools to help you and others learn the more organized and unambiguous scientific ones. You can communicate with anyone in the world with scientific names, but even the bryologists will not be sure what moss you mean with most common names.

Conventions in formatting follow Glime (1989). The **meaning** of the scientific name, as supplied by Elizabeth Dunham, is provided immediately after the scientific name. Any structure to which the name applies is in parentheses. Nomenclature follows Anderson, *et al.* (1990).

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Amblystegiaceae

Amblystegium Schimp. in B.S.G.: blunt roof (operculum)[9]; Hime-yanagi-goke = small willow moss[13]; willow-leafed moss[14]; creeping moss[25]

Amblystegium serpens (Hedw.) B.S.G.: creeping cedar mos[2]; creeping feather moss[8, 11]; delicate willow moss[13]; common willow-leafed moss[14]; slender creeping moss[25]

Amblystegium serpens var. *juratzkanum* (Schimp.) Rau & Herv.: long willow leaf moss[14]

Amblystegium varium (Hedw.) Lindb.: variable willow-leafed moss[14]; grove creeping moss[25]

Calliergon (Sull.) Kindb.: something beautifully made[9]; exquisite feather-moss[4]; sasa (bamboo) leaf moss[13]; wetland moss[14]; spoon moss[25]

Calliergon cordifolium (Hedw.) Kindb.: Schreber's cedar mos[2]; heart-leaved feather moss[8, 11]; sasa leaf moss[13]; common wetland moss[14]; marsh spoon moss[25]

Calliergon giganteum (Schimp.) Kindb.: gigantic feather moss[11]; large leaf wetland moss[14]; large spoon moss[25]

Calliergon megalophyllum Mik.: giant spoon moss[25]

Calliergon richardsonii (Mitt.) Kindb. in Warnst.: gold spoon moss[25]

Calliergon stramineum (Brid.) Kindb.: straw-like feather moss[8, 11]; thread sasa leaf moss[13]; yellow wetland moss[14]; pale spoon moss[25]

Calliergon trifarium (Web. & Mohr.) Kindb.: three-ranked feather moss[8, 11]; worm moss[25]

Calliergonella Loeske: spear head moss[13]; large wetland moss[14]

Calliergonella cuspidata (Hedw.) Loeske: pointed bog feather moss[7, 8]; pointed feather moss[11]; common large wetland moss[14]; pointed bog feather-moss[20]; spear moss[25]

Campylium (Sull.) Mitt.: golden creeping moss[13]; fine wet moss[14]; spaced-out moss[25]

Campylium chrysophyllum (Brid.) J. Lange: golden feather moss[11]; golden creeping moss[13]; yellow-leaf fine wet moss[14]; earth spaced-out moss[25]

Campylium halleri (Hedw.) Lindb.: Hallerian feather moss[8]; Haller's feather moss[11]

Campylium hispidulum (Brid.) Mitt.: false willow moss[13]; common fine wet moss[14]

Campylium polygamum (Schimp. in B.S.G.) C. Jens.: cluster-flowered feather moss[11]; long-rib fine wet moss[14]; seashore spaced-out moss[25]

Campylium radicale (P. Beauv.) Grout: long-stalked creeping feather moss[11]

Campylium stellatum (Hedw.) C. Jens.: yellow starry feather moss[8]; yellow starry feather moss[11]; Hokkaido golden creeping moss[13]; inclined-leaf fine wet moss[14]; gold spaced-out moss[25]

Conardia compacta (C. Müll.) Robins.: coast creeping moss[25]

Cratoneuron (Sull.) Spruce: hooked mosses[5]; shaguma moss (wooden tool to make hairdo[13]; cow-horn moss[14]; tufa moss[25]

Cratoneuron filicinum (Hedw.) Spruce: hooked moss[5]; lesser golden fern feather moss[8, 11]; common cow-horn moss[14]; river tufa moss[25]

Drepanocladus (C. Müll.) G. Roth: sickle plant[9]; boat-hook mosses[4]; sickle mosses[5]; hooked mosses[6]; curved leaf creeping moss[13]; sickle moss[14]; hook moss[25]

Drepanocladus aduncus (Hedw.) Warnst.: claw-leaved feather moss[8]; swamp feather moss[11]; common sickle moss[14]; clay hook moss[25]

Drepanocladus capillifolius (Warnst.) Warnst.: hair hook moss[25]

Drepanocladus crassicostatus Janssens: hair hook moss[25]

Drepanocladus sendtneri (Schimp.) Warnst.: Sendtner's feather moss[11]; chalk hook moss[25]

Hamatocaulis Hadenäs: taiga hook moss[25]

Hamatocaulis lapponicus (Norrl.) Hadenäs: taiga hook moss[25]

Hamatocaulis vernicosus (Mitt.) Hadenäs: slender green feather moss[11]; stick hook moss[25]

Hygroamblystegium Loeske: brook-side feather moss[11]; brook creeping moss[25]

Hygroamblystegium fluviatile (Hedw.) Loeske: brook-side feather moss[11]; brook creeping moss[25]

Hygroamblystegium tenax (Hedw.) Jenn.: cedar mos[2]; rigid brook-side feather moss[11]; water-loving cedar moss[16]

Hygrohypnum alpestre (Hedw.) Loeske: mountain water feather moss[8]; north brook moss[25]

Hygrohypnum alpinum (Lindb.) Loeske: shiny-leafed wet moss[13]; mountain brook moss[25]

Hygrohypnum cochlearifolium (Vent. ex De Not.) Broth.: spoon brook moss[25]

Hygrohypnum duriusculum (De Not.) Jamieson: broad-leaved feather moss[11]; stiff brook moss[25]

Hygrohypnum eugyrium (Schimp. B.S.G.) Loeske: bundled feather moss[11]; twist-leaf wet-gray moss[14]; forest brook moss[25]

Hygrohypnum luridum (Hedw.) Jenn.: water feather moss[11]; common gray moss[14]; mill brook moss[25]

Hygrohypnum micans (Mitt.) Broth.: sparkling feather moss[11]

Hygrohypnum molle (Hedw.) Loeske: round-leaved hypnum[1]; soft water feather moss[8]; soft feather moss[11]; soft-leaf wet-gray moss[14]; soft brook moss[25]

Hygrohypnum montanum (Lindb.) Broth.: slender brook moss[25]

Hygrohypnum norvegicum (Schimp. B.S.G.) Amann: Nordic brook moss[25]

Hygrohypnum ochraceum (Turn. ex Wils.) Loeske: yellow mountain-rill feather moss[11]; pale yellow wet moss[13]; claw brook moss[25]

Hygrohypnum polare (Lindb.) Loeske: polar brook moss[25]

Hygrohypnum smithii (Sw. ex Lilj.) Broth.: round brook moss[25]

Hygrohypnum styriacum (Limpr.) Broth.: pointed brook moss[25]

Hygrohypnum subeugyrium (Ren. & Card.) Broth.: large forest brook moss[25]

Leptodictyum riparium (Hedw.) Warnst.: waterside feather moss[11]; willow moss[13]; common thin-net moss[14]; water creeping moss[25]

Limprichtia cossonii (Schimp.) Anderson et al.: intermediate hook moss[25]

Limprichtia revolvens (Sw.) Loeske: rusty claw-leaved feather moss[11]; magnificent hook moss[25]

Loeskypnum badium (Hartm.) Paul: brass moss[25]

Palustriella Ochyra: claw tufa moss[25]

Palustriella commutata (Brid.) Ochyra: curled fern feather moss[8, 11]; sickle shaguma moss[13]; long-leafed cow-horn moss[14]; comb tufa moss[25]

Pseudocalliergon turgescens (T. Jens.) Loeske: yellow sausage moss[25]

Sanionia uncinata (Hedw.) Loeske: hooked moss[1]; hooked boat-hook moss[4]; sickle moss[5]; sickle-leaved feather moss[8]; sickle-branched feather moss[11]; curved leaf creeping moss[13]; circleleaf moss[25]

Sarmenthypnum Tuom. & T. Kop.: sarmentose feather moss[8]; twiggy feather moss[11]; red sasa leaf moss[13]; blood spoon moss[25]

Sarmenthypnum sarmentosum (Wahlenb.) Tuom. & T. Kop.: sarmentose feather moss[8]; twiggy feather moss[11]; red sasa leaf moss[13]; blood spoon moss[25]

Scorpidium (Schimp.) Limpr.: sausage moss[25]

Scorpidium scorpioides (Hedw.) Limpr.: scorpion feather moss[8, 11]; sausage moss[25]

Warnstorfia exannulata (Schimp. in B.S.G.) Loeske: cusp-leaved feather moss[11]; mountain curved leaf creeping moss[13]; marsh hook moss[25]

Warnstorfia fluitans (Hedw.) Loeske: floating feather moss[8]; floating feather moss[11]; floating curved leaf creeping moss[13]; water hook moss[25]

Warnstorfia trichophylla (Warnst.) Tuom. & T. Kop.: pencil hook moss[25]

Brachytheciaceae

Brachythecium Schimp. in B.S.G.: short little vessel (capsule)[9]; ao-ginu-goke = green silk moss, sheep moss[13]; verdant moss[14]; grass moss[25]

Brachythecium acuminatum (Hedw.) Aust.: erect brachythecium[1]; cedar moss[16]

Brachythecium albicans (Hedw.) Schimp. in B.S.G.: lawn moss[5]; whitish feather moss[8]; white feather moss[11]; pale verdant moss[14]; pale grass moss[25]

Brachythecium campestre (C. Müll.) Schimp. in B.S.G.: field verdant moss[14]; hill grass moss[25]

Brachythecium collinum (Schleich. ex C. Müll.) Schimp. in B.S.G.: alpine verdant moss[14]

Brachythecium erythrorrhizon Schimp. in B.S.G.: taiga grass moss[25]

Brachythecium fendleri (Sull.) Jaeg.: dwarf grass moss[25]

Brachythecium frigidum (C. Müll.) Besch.: golden short-capsuled moss[5]

Brachythecium glaciale Schimp. in B.S.G.: snow feather moss[11]; snow grass moss[25]

Brachythecium groenlandicum (C. Jens.) Schljak.: mountain grass moss[25]

Brachythecium mildeanum (Schimp.) Schimp. ex Milde: clay grass moss[25]

Brachythecium oedipodium (Mitt.) Jaeg.: Ezo-aoginu-goke=Ezo green silk[13]; sprawling grass moss[25]

Brachythecium oxycladon (Brid.) Jaeg.: long-capsuled brachythecium[1]

Brachythecium plumosum (Hedw.) Schimp. in B.S.G.: rusty feather moss[8, 11]; hane-hitsuji-goke=feather sheep moss[13]; plume-branched verdant moss[14]; brook grass moss[25]

Brachythecium populeum (Hedw.) Schimp. in B.S.G.: matted feather moss[8, 11]; ao-ginu-goke = green silk moss[13]; long-rib verdant moss[14]; park grass moss[25]

Brachythecium reflexum (Starke in Web. & Mohr.) Schimp. in B.S.G.: reflexed feather moss[8, 11]; araeno-hitsuji-goke=sheep moss with papillose seta[13]; curve-leafed verdant moss[14]; slender grass moss[25]

Brachythecium rivulare Schimp. in B.S.G.: rivulet brachythecium[1]; rivulet cedar mos[2]; waterside feather moss[11]; tani-goke = valley moss[13]; common verdant moss[14]; river grass moss[25]

Brachythecium rutabulum (Hedw.) Schimp. in B.S.G.: rough-stalked feather moss[7, 11]; common rough-stalked feather moss[8]; hirohano-fusa-goke=tuft moss with wide leaves[13]; common rough-stalked feather-moss[20]; large grass moss[25]

Brachythecium salebrosum (Web. & Mohr.) Schimp. in B.S.G.: smooth-stalked yellow feather moss[8]; smooth-stalked streaky feather moss[11]; wide-leafed bushy moss[13]; pleat-leafed verdant moss[14]; forest grass moss[25]

Brachythecium starkei (Brid.) Schimp. in B.S.G.: Stark's feather moss[11]; dewano-hitsuji-goke=Dewa sheep moss[13]; woodland verdant moss[14]; spaced-out grass moss[25]

Brachythecium trachypodium (Brid.) Schimp. in B.S.G.: slate grass moss[25]

Brachythecium turgidum (Hartm.) Kindb.: thick grass moss[25]

Brachythecium velutinum (Hedw.) Schimp. in B.S.G.: velvet feather moss[7, 8, 11]; kinu-hitsuji-goke=silky sheep moss[13]; fine-leaf verdant moss[14]; velvet feather-moss[20]; velvet grass moss[25]

Bryhnia Kaur.: for Bryhn of Norway[9]; arrowhead moss[13]; swallow-tail moss[14]

Bryhnia novae-angliae (Sull. & Lesq. in Sull.) Grout: arrowhead moss[13]; common swallow-tail moss[14]; brynia[25]

Bryoandersonia illecebra (Hedw.) Robins.: spoon-leaved moss[1, 2, 6, 16]; neat feather moss[8]

Cirriphyllum Grout: curly hair leaf[9]; mustache leaf moss[13]; hairy-leaf-tip moss[14]; hair grass moss[25]

Cirriphyllum cirrosum (Schwaegr. in Schultes) Grout: cirrhose feather moss[8]; tendril-pointed feather moss[11]; mustache leaf moss[13]; common hairy-leaf-tip moss[14]; alpine hair grass moss[25]

Cirriphyllum piliferum (Hedw.) Grout: hair-pointed feather moss[8]; long mustache leaf moss[13]; hair grass moss[25]

Eurhynchium Schimp. in B.S.G.: well beak (operculum)[9]; long-beaked hypnum[4]; beaked mosses[6]; beautiful-beak moss[14]; beaked moss[16]; rib moss[25]

Eurhynchium hians (Hedw.) Sande Lac.: light beaked moss[1]; long feather moss[11]; false nagi (Podocarpus) moss[13]; grove rib moss[25]

Eurhynchium oreganum (Sull.) Jaeg.: Oregon beaked moss[5]

Eurhynchium praelongum (Hedw.) Schimp. in B.S.G.: slender beaked moss[5]; long trailing feather moss[7]; prolonged feather-moss[20]

Eurhynchium pulchellum (Hedw.) Jenn.: common beaked mos[2]; elegant feather moss[8]; compact frond moss[11]; high-hair crane-beak moss[13]; common beautiful-beak moss[14]; little rib moss[25]

Homalothecium Schimp. in B.S.G.: straight-capsule moss[14]; curl moss[25]

Homalothecium fulgescens (Mitt. ex C. Müll.) Lawt.: yellow moss[5]

Homalothecium nuttallii (Wils.) Jaeg.: creeping beauty[5]

Homalothecium sericeum (Hedw.) Schimp. in B.S.G.: silky wall feather moss[7]; silky feather moss[8]; silky leskea, golden moss[11]; common straight-capsule moss[14]; gold curl moss[25]

Isothecium Brid.: small herb moss[13]; cat-tail moss[14]; swan moss[25]

Isothecium alopecuroides (Dubois) Isov.: curved feather moss[8]; blunt-leaved tree moss[11]; rat swan moss[25]

Isothecium myosuroides Brid.: mouse-tail feather moss[8]; acute-leaved frond moss[11]; round-branch cat-tail moss[14]; mouse swan moss[25]

Myuroclada Besch.: mouse-tail moss[14]

Myuroclada maximowiczii (Borsz. in Maxim.) Steere & Schof.: rat tail moss[13]; common mouse-tail moss[14]

Palamocladium C. Müll.: crease-leaf moss[14]

Platyhypnidium Fleisch.: beaked water moss[1]; long-beaked water feather moss[7, 8, 11]; green creeping moss[13]; brook beak moss[25]

Platyhypnidium riparioides (Hedw.) Dix.: beaked water moss[1]; long-beaked water feather moss[7, 8, 11]; green creeping moss[13]; brook beak moss[25]

Pseudoscleropodium (Limpr.) Fleisch. in Broth.: large-silk moss[14]

Pseudoscleropodium purum (Hedw.) Fleisch. in Broth.: neat meadow feather moss[8]; neat moss, comb moss[11]; common large-silk moss[14]; swollen moss[25]

Scleropodium Schimp.: papillose-stick moss[14]

Scleropodium cespitans (C. Müll.) L. Koch: green patch feather moss[11]

Scleropodium obtusifolium (Jaeg.) Kindb. in Mac. & Kindb: blunt-leaved moss[5]

Scleropodium touretii (Brid.) L. Koch: alluring feather moss[11]; common papillose-stick moss[14]

Steerecleus serrulatus (Hedw.) Robins.: dark beaked moss[1]

Tomenthypnum nitens (Hedw.) Loeske: shining feather moss[8, 11]; golden moss[25]

Entodontaceae

Entodon C. Müll.: tooth within (peristome)[9]; glossy entodon mosse[2]; shiny moss[13]; silk moss[14]

Entodon cladorrhizans (Hedw.) C. Müll.: flat-stemmed entodon[1, 2]; flat-stemmed Entodon[6]; common silk moss[14]

Entodon compressus (Hedw.) C. Müll.: round-leafed shiny moss[13]; thick-corner silk moss[14]; brilliant moss[25]

Entodon concinnus (De Not.) Par.: round-leafed shiny moss[13]; thick-corner silk moss[14]; brilliant moss[25]

Entodon macropodus (Hedw.) C. Müll.: Tsukushi shiny moss (N. part of Kyushu)[13]

Entodon seductrix (Hedw.) C. Müll.: round-stemmed entodon[1, 2, 6]; American silk moss[14]; glossy moss[16]

Fabroniaceae

Anacamptodon Brid.: Soriha-goke = curved leaf moss[13]; recurved teeth moss[14]

Anacamptodon splachnoides (Fröl. ex Brid.) Brid.: knothole mos[2, 6, 10]; common recurved teeth moss[14]

Clasmatodon Hook. & Wils. in Wils.: broken teeth moss[14]

Fabronia Raddi: crushed rice moss[13]; crushed-rice moss[14]

Fabronia ciliaris (Brid.) Brid.: false crushed rice moss[13]; eight-teeth crushed-rice moss[14]

Fabronia pusilla Raddi: common crushed-rice moss[14]

Helodiaceae

Helodium Warnst.: swamp moss[9]; pond fern moss[13]; wetland-plume moss[14]

Helodium blandowii (Web. & Mohr.) Warnst.: Blandow's feather moss[8,11]; common wetland-plume moss[14]; marsh comb moss[25]

Helodium paludosum (Sull.) Aust.: pond fern moss[13]; narrow-leaf wetland-plume moss[14]

Hylocomiaceae

Hylocomiastrum Fleisch. in Broth.: inhabitant of the woods[9]; rock-hanging moss[13]; pagoda moss[14]; house moss[25]

Hylocomiastrum pyrenaicum (Spruce) Fleisch. in Broth.: mountain dragon-tail moss[13]; mountain pagoda moss[14]; large house moss[25]

Hylocomiastrum umbratum (Hedw.) Fleisch. in Broth.: shaded feather moss[8]; shady rock feather moss[11]; shady pagoda moss[14]; dark house moss[25]

Hylocomium Schimp. in B.S.G.: inhabitant of the woods[9]; rock-hanging moss[13]; pagoda moss[14]; house moss[25]

Hylocomium splendens (Hedw.) Schimp. in B.S.G.: mountain fern moss[1,2,3,5]; glittering feather-moss[4]; glittering feather moss[7,8,11]; stair-step moss, mountain fern moss[10]; rock-hanging moss[13]; common pagoda moss[14]; house moss[25]

Loeskeobryum Fleisch. in Broth.: common rough-stalked feather moss[8]; short-beaked water feather moss[11]; thick dragon tail moss[13]; western house moss[25]

Loeskeobryum brevirostre (Brid.) Fleisch. in Broth.: common rough-stalked feather moss[8]; short-beaked water feather moss[11]; thick dragon tail moss[13]; western house moss[25]

Pleurozium Mitt.: Schreber's moss[1,5]; red-stemmed feather-moss[4]; red stemmed feather moss[7]; Schreberian feather moss[8]; red-stemmed feather moss[11]; erect hypnum[13]; red-stem moss[14]; big red stem[21]; wall moss[25]

Pleurozium schreberi (Brid.) Mitt.: Schreber's moss[1,5]; red-stemmed feather-moss[4]; red stemmed feather moss[7]; Schreberian feather moss[8]; red-stemmed feather moss[11]; erect hypnum[13]; red-stem moss[14]; big red stem[21]; wall moss[25]

Rhytidiadelphus (Lindb. ex Limpr.) Warnst.: wrinkled brotherhood (leaves)[9]; tuft moss[13]; rhytidium-like moss[14]; notch moss[25]

Rhytidiadelphus loreus (Hedw.) Warnst.: little shaggy moss[5]; rambling mountain feather moss[8,11]; point-leaf rhytidium-like moss[14]; western notch moss[25]

Rhytidiadelphus squarrosus (Hedw.) Warnst.: bent-leaf moss[5]; drooping-leaved feather moss[7,8,11]; tuft moss[13]; reverse-leaf rhytidium-like moss[14]; grass notch moss[25]

Rhytidiadelphus triquetrus (Hedw.) Warnst.: shaggy moss[1,2,3]; triangular wood-reveller[4]; big shaggy moss[5]; triangular-leaved feather moss[7,11]; triquetrous feather moss[8]; shaggy moss, rough neck moss[10]; large tuft moss[13]; common rhytidium-like moss[14]; goose neck moss[21]; garland notch moss[25]

Rhytidiopsis robusta (Hook.) Broth.: robust moss[5]

Hypnaceae

Callicladium haldanianum (Grev.) Crum: common hypnum[1]; common cedar moss[2]; shiny moss[3]; herb moss[13]; haldane moss[25]

Ctenidium Mitt.: diminutive comb (branching)[9]; comb tooth moss[13]; comb moss[14]

Ctenidium malacodes Mitt.: common comb moss[14]

Ctenidium molluscum (Hedw.) Mitt.: plumy crested feather moss[7]; plumy-crested feather moss[8, 11]; chalk comb moss[25]

Gollania Broth.: coarse-branch moss[14]

Herzogiella Broth.: shiny red yew moss[13]; sprawl moss[25]

Herzogiella seligeri (Brid.) Iwats.: stump sprawl moss[25]

Herzogiella striatella (Brid.) Iwats.: round stump moss[25]

Herzogiella turfacea (Lindb.) Iwats.: flat stump moss[25]

Homomallium (Schimp.) Loeske: same to rise (branches to one side)[9]; kinuta moss (old tool for making silk)[13]; hairy-gray moss[14]; climbing moss[25]

Homomallium incurvatum (Brid.) Loeske: incurved feather moss[8, 11]; common hairy-gray moss[14]

Hypnum Hedw.: Greek for moss[9]; cedar mosse[2]; creeping moss[13]; gray moss[14]; sleep moss[17]; pigtail moss[25]

Hypnum bambergeri Schimp.: Bamberger's feather moss[11]; gold pigtail[25]

Hypnum callichroum Funck ex Brid.: hook-leaved feather moss[11]; down pigtail[25]

Hypnum circinale Hook.: coiled-leaf moss[5]

Hypnum cupressiforme Hedw.: cypress-leaved feather moss[7, 8, 11]; common gray moss[14]; cypress-leaved feather-moss[20]; cypress pigtail[25]

Hypnum cupressiforme var. *filiforme* Brid.: cypress-leaved feather moss[7, 8, 11]; cypress-leaved feather-moss[20]

Hypnum cupressiforme var. *julaceum* Brid.: cypress-leaved feather moss[7, 8, 11]; cypress-leaved feather-moss[20]

Hypnum cupressiforme var. *lacunosum* Brid.: cypress-leaved feather moss[7, 8, 11]; cypress-leaved feather-moss[20]

Hypnum cupressiforme var. *resupinatum* (Tayl.) Schimp. in Spruce: cypress-leaved feather moss[7, 8, 11]; cypress-leaved feather-moss[20]

Hypnum cupressiforme var. *subjulaceum* Mol.: cypress-leaved feather moss[7, 8, 11]; cypress-leaved feather-moss[20]

Hypnum hamulosum Schimp. in B.S.G.: small pinnate feather moss[11]; mountain pigtail[25]

Hypnum imponens Hedw.: pinnate hypnum[1]; feather mos[2]; flat-tufted feather moss[11]; magnificent pigtail[25]

Hypnum jutlandicum Holmen & Warncke: flat pigtail[25]

Hypnum lindbergii Mitt.: Hokkaido creeping moss[13]; clay pigtail[25]

Hypnum mammillatum (Brid.) Loeske: fallow pigtail[25]

Hypnum pallescens (Hedw.) P. Beauv.: small epiphytic creeping moss[13]; yellow gray moss[14]; stump pigtail[25]

Hypnum pallescens var. *protuberans* (Brid.) Aust.: small epiphytic creeping moss[13]

Hypnum pratense (Rabenh.) Koch ex Spruce: meadow feather moss[11]; flat gray moss[14]

Hypnum recurvatum (Lindb. & Arnell) Kindb.: wrinkled pigtail[25]

Hypnum revolutum (Mitt.) Lindb.: rolled-leaf gray moss[14]; border pigtail[25]

Hypnum subimponens Lesq.: curly hypnum[5]

Hypnum vaucheri Lesq.: worm pigtail[25]

Isopterygiopsis alpicola (Lindb. & Arnell) Hedenäs: northern luster moss[25]

Isopterygiopsis muelleriana (Schimp.) Iwats.: Hokkaido glossadelphus[13]

Isopterygiopsis pulchellum (Hedw.) Iwats.: neat mountain feather moss[11]

Isopterygium Mitt.: equal little wing (leaf arrangement)[9]; red yew moss[13]; equal-leafed moss[14]; luster moss[25]

Orthothecium Schimp. in B.S.G.: shiny moss with erect capsules[13]; gray-rock moss[14]; lustrous moss[25]

Orthothecium chryseum (Schwaegr. in Schultes) Schimp. in B.S.G.: golden gray-rock moss[14]; yellow lustrous moss[25]

Orthothecium intricatum (Hartm.) Schimp. in B.S.G.: flat-leaved leskea[11]; very small narrow-leafed shiny moss[13]; little lustrous moss[25]

Orthothecium rufescens (Brid.) Schimp. in B.S.G.: red mountain feather moss[8]; red leskea[11]; small narrow-leafed shiny moss[13]; red lustrous moss[25]

Orthothecium strictum Lor.: erect lustrous moss[25]

Platydictya Berk.: thread-like willow moss[13]

Platydictya jungermannioides (Brid.) Crum: false willow moss[13]; dwarf creeping moss[25]

Platygyrium Schimp. in B.S.G.: large ring (capsule mouth)[9]; flat-brocade moss[14]

Platygyrium repens (Brid.) Schimp. in B.S.G.: common flat-brocade moss[14]; copper lustrous moss[25]

Ptilium De Not.: feather (plants)[9]; hairy-comb moss[14]

Ptilium crista-castrensis (Hedw.) De Not.: plume moss[1]; plume moss, knight's plum[2]; ostrich plume moss[3]; knight's plume moss[4, 21]; ostrich-plume feather moss[7, 8]; knight's plume[10]; ostrich plume feather moss[11]; ostrich moss[13]; common hairy-comb moss[14]; comb moss[25]

Pylaisiella Kindb.: light green tree mosse[2]; silk moss[13]; small golden-gray moss[14]

Pylaisiella intricata (Hedw.) Grout: common pylaisiella[1]; common pylaisi[2]; velvet moss[13]

Pylaisiella polyantha (Hedw.) Grout: many-fruited feather moss[8]; many-flowered leskea[11]; aspen moss[25]

Taxiphyllum Fleisch.: yew leaf moss[13]; scale-leaf moss[14]

Taxiphyllum taxirameum (Mitt.) Fleisch.: yew leaf moss[13]; common scale-leaf moss[14]

Vesicularia (C. Müll.) C. Müll.: transparent-leaf moss[14]

Hypopterygiaceae

Hypopterygium Brid.: peacock moss[13, 14]

Hypopterygium fauriei Besch.: peacock moss[13]; long-rib peacock moss[14]

Leskeaceae

Bryohaplocladium Wat. & Iwats.: small-leafed silk moss[13]; small plume moss[14]

Bryohaplocladium microphyllum (Hedw.) Wat. & Iwats.: fine-leafed small plume moss[14]

Claopodium (Lesq. & James) Ren. & Card.: coarse-plume moss[14]

Claopodium crispifolium (Hook.) Ren. & Card.: rough moss[5]; mountain needle moss[13]; common coarse-plume moss[14]

Claopodium pellucinerve (Mitt.) Best: papillose coarse-plume moss[14]

Leptopterigynandrum C. Müll.: fork-plume moss[14]

Lescuraea Schimp. in B.S.G.: Lesquereux's mosses[5]; high mountain moss[13]; hairy moss[14]; bow moss[25]

Lescuraea saxicola (Schimp. in B.S.G.) Milde: lustrous bow moss[25]

Leskea Hedw.: for Leske of Leipsic[9]; dusky moss[13]; delicate moss[14]

Leskea polycarpa Hedw.: long-headed feather moss[8]; many-fruited leskea[11]; Koshina dusky moss[13]; common delicate moss[14]; willow moss[25]

Leskeella (Limpr.) Loeske: fine moss[14]

Leskeella nervosa (Brid.) Loeske: nerved leskea[11]; common fine moss[14]

Lindbergia Kindb.: fine-branch moss[14]

Lindbergia brachyptera (Mitt.) Kindb.: papillose fine-branch moss[14]

Pseudoleskea Schimp. in B.S.G.: grass moss[14]

Pseudoleskea incurvata (Hedw.) Loeske: common grass moss[14]; pale bow moss[25]

Pseudoleskea patens (Lindb.) Kindb.: rasp bow moss[25]

Pseudoleskea radicosa (Mitt.) Mac. & Kindb.: dense-rooted grass moss[14]; stiff bow moss[25]

Pseudoleskeella Kindb.: false-Leskeella[14]; dwarf bow moss[25]

Pseudoleskeella siberica (Arnell) P. Wils. & Norris: catenulated feather moss[8]; thread-like feather moss[11]; blunt dwarf bow moss[25]

Pseudoleskeella tectorum (Funck ex Brid.) Kindb. in Broth.: northern dwarf bow moss[25]

Myriniaceae: northern dwarf bow moss[25]

Myrinia pulvinata (Wahlenb.) Schimp.: pulvinate leskea[8]; green-cushioned leskea[11]; flood moss[25]

Schwetschkeopsis Broth.: schwetschkea-like moss[14]

Schwetschkeopsis fabronia (Schwaegr.) Broth.: false hair moss (wig moss?)[13]

Plagiotheciaceae

Plagiothecium Schimp. in B.S.G.: oblique little vessel (capsule)[9]; Hokkaido ball moss[13]; cotton moss[14]; silk moss[25]

Plagiothecium cavifolium (Brid.) Iwats.: woodsy plagiothecium[1]; wood feather moss[7, 11]; sanada moss (rope moss)[13]; round-branch cotton moss[14]; wood feather-moss[20]; round silk moss[25]

Plagiothecium denticulatum (Hedw.) Schimp. in B.S.G.: slender plagiothecium[1]; slender cedar mos[2]; slender moss[3]; sharp fern-like feather moss[7]; sharp flat-leaved feather moss[11]; common cotton moss[14]; sharp flat-leaved feather-moss[20]; forest silk moss[25]

Plagiothecium laetum Schimp. in B.S.G.: denticulate leafed rope[13]; glossy cotton moss[14]; wood silk moss[25]

Plagiothecium latebricola Schimp. in B.S.G.: lurking leskea[8]; hidden leskea[11]; alder silk moss[25]

Plagiothecium piliferum (Sw. ex Hartm.) Schimp. in B.S.G.: hair silk moss[25]

Plagiothecium undulatum (Hedw.) Schimp. in B.S.G.: wavy plagiothecium[5]; waved feather moss[7, 11]; wavy-leaf cotton moss[14]; path silk moss[25]

Pleuroziopsidaceae

Pleuroziopsis Kindb. ex Britt.: tree moss[14]

Pleuroziopsis ruthenica (Weinm.) Kindb. ex Britt.: 10,000 year herb of Mt. Fuji[13];common tree moss[14]

Pterigynandraceae

Heterocladium Schimp. in B.S.G.: differential-branching moss[14]; tangle moss[25]

Heterocladium dimorphum (Brid.) Schimp. in B.S.G.: dimorphous feather moss[8]; hair-like feather moss[11]; spaced-out tangle moss[25]

Iwatsukiella leucotricha (Mitt.) Buck & Crum: hairy-leaf-tip soft-teeth moss[14]

Myurella Schimp. in B.S.G.: mousetail (slender branches)[9]; reishi moss (a kind of fruit)[13]; small-mouse-tail moss[14]; round moss[25]

Myurella julacea (Schwaegr.) Schimp. in B.S.G.: slender leskea[11]; shell moss[13]; common small-mouse-tail moss[14]; round moss[25]

Myurella sibirica (C. Müll.) Reim.: reishi moss (a kind of fruit)[13]; Siberian small-mouse-tail moss[14]

Myurella tenerrima (Brid.) Lindb.: acute-leafed shell moss[13]; hair round moss[25]

Pterigynandrum Hedw.: side-inflorescence moss[14]

Pterigynandrum filiforme Hedw.: thread-like wing moss[11]; twisted thread moss[13]; common side-inflorescence moss[14]; rope moss[25]

Rhytidiaceae

Rhytidium (Sull.) Kindb.: droop-branch moss[14]

Rhytidium rugosum (Hedw.) Kindb.: wrinkle-leaved feather moss[8, 11]; thick moss[13]; common droop-branch moss[14]; beruffled moss[25]

Sematophyllaceae

Acroporium Mitt.: ink brush moss[13]; apical pore moss[14]

Brotherella Loeske ex Fleisch.: mirror moss[13]; small brocade moss[14]

Brotherella recurvans (Michx.) Fleisch.: common raphidostegium[1]

Heterophyllium (Schimp.) C. Müll. ex Kindb.: decayed-wood moss[14]

Heterophyllium affine (Hook. in Kunth) Fleisch.: forest herb moss[13]

Sematophyllum Mitt.: long beak moss[13]; brocade moss[14]

Sematophyllum demissum (Wils.) Mitt.: prostrate rock feather moss[11]; common brocade moss[14]

Sematophyllum subpinnatum (Brid.) Britt.: green-patch feather moss[8]; tuft brocade moss[14]

Taxithelium Spruce ex Mitt.: papillose-brocade moss[14]
Taxithelium planum (Brid.) Mitt.: common papillose-brocade moss[14]
Wijkia Crum: thorn-branch moss[14]

Stereophyllaceae
Stereophyllum Mitt.: stiff-leaf moss[14]

Thamnobryaceae
Porotrichum (Brid.) Hampe: stiff-branch moss[14]
Thamnobryum Nieuwl.: bush or tree moss[9]; large tiger tail moss[13]; wood moss[14]

Theliaceae
Thelia Sull. in Sull. & Lesq.: papilla[9]; scale moss[14]
Thelia hirtella (Hedw.) Sull. in Sull. & Lesq.: common thelia[1, 2]

Thuidiaceae
Abietinella abietina (Hedw.) Fleisch.: wiry fern moss[1, 2]; spruce-tree feather moss[8]; pine-tree feather moss[11]; fir fern moss[13]; mountain plume moss[14]; gravel comb moss[25]
Cyrto-hypnum minutulum (Hedw.) Buck & Crum: tiny cedar moss[4]; fine plume moss[14]
Rauiella praelonga (Schimp. ex Besch.) Wijk & Marg.: small-leafed silk moss[13]
Rauiella scita (P. Beauv.) Reim.: smaller fern moss[1]
Thuidium Schimp. in B.S.G.: small feathery branched tree[9]; fern mosses[1, 2, 6, 10]; cedar mosses[4]; fern moss[13, 16]; plume moss[14]; little cedar[17]; arbor-vitae moss[25]
Thuidium delicatulum (Hedw.) Schimp. in B.S.G.: common fern moss[1, 2, 6, 10]; delicate fern moss[3]; dainty cedar moss[4]; delicate feather moss[11]; small-leafed Hokkaido fern moss[13]; fine-branch plume moss[14]
Thuidium philibertii Limpr.: inclined arbor-vitae moss[25]
Thuidium recognitum (Hedw.) Lindb.: Hokkaido fern moss[13]; hook-leaf plume moss[14]; chalk arbor-vitae moss[25]
Thuidium tamariscinum (Hedw.) Schimp. in B.S.G.: tamarisk-leaved feather moss[7, 11]; proliferous feather moss[8]; large fern moss[13]; common plume moss[14]; tamarisk feather-moss[20]; large arbor-vitae moss[25]

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[1] Grout, A. J. 1900. Mosses with a hand-lens. Press of Binghampton Republican, New York, 74 Pp.; Grout, A. J. 1903. Mosses with a handlens and microscope. By Author. N. Y.

[2] Bland, J. 1971. Forests of Lilliput. Prentice-Hall, Inc., Englewood Cliffs. 210 Pp.

[3] Shuttleworth, F. S. & H. S. Zim. 1967. Non-flowering plants. Ferns, mosses, lichens, mushrooms and other fungi. A Golden Nature Guide, Golden Press, N.Y. 160 Pp.

[4] Marshall, N. L. 1907. Mosses and lichens. Doubleday, Page & Co., N. Y. 327 Pp.

5 Harthill, M. P. and I. O'Connor. 1975. Common mosses of the Pacific coast. Naturegraph.

6 Welch, W. H. 1957. Mosses of Indiana. An illustrated manual. The Bookwalter Company, Indianapolis. 478 Pp.

7 Jewell, A. L. 1955. The observer's book of mosses and liverworts. Frederick Warne and Co. Ltd., N. Y.

8 Stark, R. M. 1860. A popular history of British mosses, 2nd edition. Routledge, Warne, & Routledge, London (Wheldon & Wesley), 348 Pp.

9 Dunham, E. M. 1951. How to know the mosses. The Mosher Press, Boston.

10 Crum, H. 1976. Mosses of the Great Lakes forest, revised edition. Univ. Mich. 10: 1-404.

11 Tripp, F. E. 1888. British mosses, their homes, aspects, structure and uses. George Bell & Sons, Covent Garden, London (Wheldon & Wesley), 2 Vol.

13 Dr. Zen Iwatsuki (personal communication)

14 Jinkun Zhang (personal communication, translated from Wu et al. 1984)

16 Thomas, L. P. and J. R. Jackson. 1985. Walk softly upon the earth. A pictorial guide to Missouri mosses, liverworts and lichens. Missouri Department of Conservation, Jefferson City, 129 pp.

17 Britton, E. G. 1900. Mosses. Nature Study Leaflets, Natural Science Committee of the Associate Alumnae of the Normal College, New York City 4: 1-9.

20 Russell, T. H. 1910. Mosses and liverworts. An introduction to their study, with hints as to their collection and preservation. Sampson Low, Marston & Co., LD. 211 Pp., 10 plates.

21 Vitt, D. H., J. E. Marsh, and R. B. Bovey. 1988. Mosses, lichens & ferns of northwest North America. Lone Pine Publishing, Edmonton, Alberta, Can. 296 Pp.

25 Hallinbeck, T. and L. Soderstrom. 1987. Sveriges mossor och deras svenska namm -- en kommenterad checklista. [The bryophytes of Sweden, an annotated checklist with common names.] Svensk Bot. Tidskr. 81: 357-388.

Literature Cited

Anderson, L. E., Crum, H. A. and Buck, W. R. 1990. List of the mosses of North America North of Mexico. *Bryologist* 93: 448-499.

Glime, J. M. 1989. Should mosses have common names? *Evansia* 6(1):1-6.

The 11th Annual Midwestern Foray, Southern Illinois

R. Stotler & B. Crandall-Stotler[1]

(with contributions from: B. Allen, K. Lyman, W. Norris, T. O'Brien, G. Pedano, R. Pursell, G. Smith Merrill, J. Thomson, & J. Toppin)

The 11th Annual Midwestern foray, held in southern Illinois the weekend of 16-18 October, 1993 was attended by 43 participants. Headquartered at the Southern Illinois University Touch of Nature facility, a Friday evening mixer was highlighted with a slide presentation on the Shawnee National Forest by Lawrence Stritch of the U. S. Forest Service. This nicely introduced all to the varied habitats of the region which range from lowland cypress/tupelo gum swamps (*Taxodium distichum* (L.) Rich./ *Nyssa aquatica* L.) to various natural areas characterized by sandstone bluffs, rock ledges, canyons and ravines. The forest is *Quercus* L./ *Carya* Nutt. dominated, comprised of numerous species of Oaks and half a dozen common Hickory species. Often referred to as the Illinois Ozarks, the southern most portion of Illinois is, however, geologically distinct from that limestone based region. Northward from the confluence of the Mississippi and Ohio Rivers, the ancient tertiary flood plain of the Gulf of Mexico gives rise to an abrupt east/west line of Pennsylvanian sandstone ridges and bluffs that are intersected with canyons in a line about 35 km wide delimiting the southernmost front of the four glaciers that had invaded Illinois during the Pleistocene. This region is biologically quite unique in that it demarcates N, S, E, and W range end points for an unusually high number of floral and faunal representatives.

Bryophytes and lichens were observed at four locations over the weekend. The first site visited [BT] was an impressive cypress grove towered by several "big trees" estimated to be 1000 years in age. This relatively small tract is located in Pulaski County and was previously owned by the Main Brothers Box and Lumber Company. No collecting permit was issued for this preserve, which represents a recent purchase by the Illinois Department of Conservation. Among the cryptogams observed here were fairly large patches of *Ptychomitrium drummondii* and *Porella pinnata* commonly occurring on the cypress trunks as well as the lichenized fungi *Bacidia incompta* and *Haematomma pustulatum*.

The second stop of the morning was Heron Pond [HP] an Illinois Department of Conservation Nature Preserve located in Johnson County. This site is a textbook example of what a swamp should be. It is everything one could hope to find in a bald cypress/tupelo gum swamp except for the absence of Spanish moss (*Tillandsia* L.). A floating boardwalk turns its way out into the swamp allowing visitors to enjoy the serenity of this peaceful area. The water is totally hidden by a cover of duckweeds (*Lemna* L.,

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Spirodela Schleiden, *Wolffia* Horkel ex Schleiden, and *Wolffiella* Hegelm.) interrupted with occasional *Limnobium spongia* (Bosc) Steudel. plants. Again, no collecting permits were issued for this preserve but interesting lichens and bryophytes were abundant. Notable were the hornworts *Notothylas orbicularis* and *Phaeoceros* cf. *carolineanus* appearing on the barren, recently exposed mud flats of the receding Cache River waters. This same habitat also provided substrate for *Fissidens obtusifolius* Wils., *F. fontanus* (Pyl.) Steud. and *F. pusillus* Wils.

Following lunch, the entire afternoon was spent at Hayes Creek Canyon [HC] where participants scattered, observed, and sampled the bryo/lichen flora. Our entry from a farm pasture led from xeric, exposed sandstone outcrops bordered with scrub oaks and red cedar (*Juniperus virginiana* L.). The exposed root of one such red cedar supported a colony of *Ochrolechia arborea* and in an upper tributary channel was *Peltigera rufescens* in abundance. Nearby, *Campylopus tallulensis* Sull. & Lesq. was collected. On sandstone in the fells area *Rhinodina chrysomelaena* was collected which is thought to represent a new record for Illinois. Our trail down this dry sandstone gulch led into a mesic lowland wooded area. Here we encountered sandstone outcrops and ledges constantly moist with seepage in close proximity to Hayes Creek. One such ledge supported a hanging bog comprised of populations of *Spagnum compactum* DC and the isophyllous form of *S. capillifolium* (Ehrh.) Hedw. An adjacent low rock outcrop with a different aspect supported *Pellia epiphylla* and *Diplophyllum apiculatum* populations. The boreal taxon *Trichocolea tomentella* was seen in a more protected, shaded habitat tucked below a moist sandstone overhang. A decorticate log in an exact stage of decay positioned in a properly sheltered region provided habitat for the boreal hepatic *Nowellia curvifolia*. While this taxon can generally be found in most of the canyon systems of southern Illinois, it rarely is encountered on more than a single log which must meet strict microhabitat requirements at this latitude.

Sunday morning greeted us on a mesic lowland trail dominated by various maples which leads into a Wilderness Area of the U. S. Forest Service, Panther's Den [PD] in the northeast corner of Union County. Here massive faulted Pennsylvanian age Pounds sandstone blocks produce a network of high vertical rock faces intersected by a maze of narrow passage ways. This habitat is especially suitable for cryptogams, being cool and moist in the otherwise hot, dry southern Illinois summer and warmer in the typically mild winter months. Aspect differences result in rock surfaces that range from very dry rock seemingly painted with *Lepraria finkii* to rock faces that remain moist and cool due to evaporation. Here mats of leafy hepatics such as *Plagiochila porelloides, Scapania nemorea*, and *Odontoschisma prostratum* cover entire surfaces. One vertical sandstone face was tightly covered with the filmy fern *Trichomanes intricatum*. Thus, while the substrate remains identical throughout the den, microhabitat is quite varied. This factor allowed participants to observe and collect an array of bryophytes and lichens in a relatively small region.

Following is a list of taxa that were observed or collected within the four locations visited on the foray (Cypress grove = BT; Heron Pond = HP; Hayes Creek Canyon = HC; Panther's Den = PD) and identified by the contributors of this brief note. Numbered collections by Allen are indicated by "A"; Pedano vouchers are denoted by "GP" and housed at MO; Pursell collections are indicated by "P"; Merrill collections are indicated by "M"; Stotler/Crandall Stotler vouchers are denoted by "S" and deposited in ABSH; Thomson vouchers are denoted by "T" and deposited at WIS with a partial set at SIU; Toppin vouchers are denoted by JT with a set deposited in SIU. While this is not by any means meant to be an exaustive compilation of the bryophytes and lichens that occur in these natural areas, it nonetheless characterizes the floristic diversity of this component within southern Illinois. Nomenclature, with few exceptions, follows Stotler and Crandall-Stotler (1977) for liverworts and hornworts, Egan (1987, 1990) for lichens, Anderson, Crum and Buck (1990) for mosses, and Anderson (1990) for *Sphagnum*.

Finally, we would like to express our sincere thanks to Lawrence Stritch for his stimulating remarks on the Shawnee National Forest and for leading us into the Hayes Creek Canyon site. We express our gratitude to Beth Shimp of the U. S. Forest Service for arranging collecting permits for the sites visited. Thanks is also given to Howard Crum for his determination of the Stotler Hayes Creek *Sphagnum* specimens.

Annotated List of Hepatics and Anthocerotes

Bazzania trilobata (L.) S. Gray [PD]
Calypogeia muelleriana (Schiffn.) K. Muell. [HC (S3429)]
Cephalozia sp. [HC]
Cephaloziella sp. [HC]
Conocephalum conicum [HC]
Diplophyllum apiculatum (Evans) Steph. [HC; PD (A15028B; M13908)]
Frullania eboracensis Gott. [HP; HC (S3433A)]
F. inflata Gott. [BT]
Leucolejeunea clypeata (Schwein.) Evs. [HC (S3433B)]
Lophocolea heterophylla (Schrad.) Dum. [HC (S3434)]
Marsupella sphacelata (Geis.) Dum. [HC (S3431)]
Metzgeria conjugata Lindb. [PD (A15033)]
Notothylas orbicularis (Schwein.) Sull. [HP]
Nowellia curvifolia (Dicks.) Mitt. [HC]
Odontoschisma prostratum (Sw.) Trev. [HC; PD]
Pallavicinia lyellii (Hook.) Carruth. [PD]
Pellia epiphylla (L.) Corda [HC]
Phaeoceros cf. carolinianus (Michx.) Prosk. [HP]
Plagiochila porelloides (Torrey ex Nees) Lindenb. [PD]
Porella pinnata L. [BT; HC; PD]
Radula sp. [HC (M13912)]
Ricciocarpos natans (L.) Corda [HP]

Scapania nemorea (L.) Grolle [HC (S3430 p.p.)]
Trichocolea tomentella (Ehrh.) Dum. [HC (M13916)]

Annotated List of Lichens

Aspicilia laevata (Ach.) Arnold [HC (T24487)]
A. cf. *olivaceopallida* Magn. [HC (T24491)]
Bacidia incompta (Borrer ex Hook.) Anzi [BT]
B. schweinitzii (Tuck.) A. Schneider [HP]
Cladina subtenuis (des Abb.) Hale & Culb. [HC (T24495)]
C. rangiferina (L.) Harm. [HC (T24504)]
Cladonia apodocarpa Robb. [HC (T24500); PD (T24514)]
C. caroliniana Schwein ex Tuck. [HC (T24502)]
C. cristatella Tuck. [HC (T24487a)]
C. furcata (Huds.) Schrader [HC (T24488)]
C. grayi G. K. Merr. ex Sandst. [HC (T24498)]
C. pleurota (Floerke) Schaerer [HC (T24505); PD (T24513)]
C. squamosa (Scop.) Hoffm. [HC (T24486, 24487, 24497, 24499)]
Dermatocarpon luridum (With.) Laundon [HC (T24485, 24503)]
Graphis lineola Ach. [HP]
G. scripta (L.) Ach. [PD (T24522)]
Haematomma pustulatum Brodo & Culb. [BT]
Huilia albocaerulescens (Wulfen) Hertel [HC (T24507)]
Lecanora hageni (Ach.) Ach. [PD (T24518)]
Lepraria finkii (B. de Lesd. in Hue) R.C. Harris [PD (T24510, 24516)]
Ochrolechia arborea (Kreyer) Almb. [HC (T24508)]
Parmelina aurulenta (Tuck.) Hale [PD (T24512)]
Parmeliopsis hyperopta (Ach.) Arn. [PD (T24520)]
Parmotrema hypotropum (Nyl.) Hale [HP]
Peltigera rufescens (Weis.) Humb. [HC (T24509)]
Pertusaria amara (Ach.) Nyl. [HP]
Phaeophyscia rubropulchra (Degel.) Moberg [HP; HC (T24493)]
Physconia detersa (Nyl.) Poelt [HP (T24511)]
Porpidia tahawasiana Gowan [HC (T24482, 24492)]
Punctelia rudecta (Ach.) Krog. [HP; HC (T24494); PD (T24515, 24517, 24524)]
Pyxine caesiopruinosa (Nyl.) Imsh. [HP]
P. sorediata (Ach.) Mont. [PD (T24523)]
Rinodina chrysomelaena Tuck. [HC (T24506)]
Xanthoparmelia angustiphylla (Gyelnik) Hale [HC (T24484, 24501)]

Annotated List of Mosses

Amblystegium serpens (Hedw.) Schimp. in B.S.G. [HC]
Anomodon attenuatus (Hedw.) Hueb. [HC; PD (GP1195)]

A. minor (Hedw.) Fuernr. [HP]
A. rostratus (Hedw.) Schimp. [PD (M13922)]
Atrichum altecristatum (Ren. & Card.) Smyth & Smyth [PD (M13928)]
A. angustatum (Brid.) Bruch & Schimp. in B.S.G. [HP; HC (GP1150; M13890); PD (M13921, 13930)]
A. crispulum (James) Sull. [HC (M13910)]
A. cylindricum (Willd. in Wedb.) G. L. Sm. [HP]
Bartramia pomiformis Hedw. [HC (M 13899)]
Brachythecium campestre (C. Muell.) Schimp. in B.S.G. [PD]
B. oxycladum (Brid.) Jaeg. [PD (A15031)]
B. rutabulum (Hedw.) Schimp. in B.S.G. [HC]
Bryoandersonia illecebra (Hedw.) Robins. [HC (GP1167)]
Bryum argenteum Hedw. [HC (GP1164)]
Campylopus tallulensis Sull. & Lesq. [HC (A15014; GP1185; M13904; S3435)]
Clasmatodon parvulus (Hampe) Sull. in A. Gray [HC (A15009)]
Climacium americanum Brid. [HC (GP1170, 1182) PD (GP1198, 1204, 1205)]
C. kindbergii (Ren. & Card.) Grout [HC (M13918); PD]
Dicranella heteromalla (Hedw.) Schimp. [HC (GP1157, 1175)]
Dicranum scoparium Hedw. [HC (GP1180)]
Diphyscium foliosum (Hedw.) Mohr [HC (GP1177)]
Entodon seductrix (Hedw.) C. Muell. [HC (GP1155)]
Fissidens bryoides Hedw. [HC (GP1152, 1153, 1178)]
F. dubius P. Beauv. [HC (P & A11085, 11087)]
F. elegans Brid. [HC (P&A11088); PD (P11090, 11091)]
F. fontanus (P. Pyl.) Steud. [HP; HC (A15022B, 15023; P&A 11084; GP1184; M13903)]
F. obtusifolius Wils. [HP; HC (P&A11086)]
F. osmundioides Hedw. [HC (P & A11089)]
F. pusillus Wils. [HP]
Fontinalis duriaei Schimp. [HC (A15011)]
Fontinalis flaccida Ren. & Card. [HC (A15022; GP1183)]
Grimmia laevigata (Brid.) Brid. [HC (A15020)]
G. pilifera P. Beauv. [HC (GP1172)]
Gymnostomum aeruginosum Sm. [HC (A15024)]
Haplophymenium triste (Ces. in De Not.) Kindb. [HP; HC (GP1156; M13902); PD (GP1199)]
Hedwigia ciliata (Hedw.) P. Beauv. [HC (GP1154; M13892; JT542)]
Homalatheciella subcapillata (Hedw.) Broth. [HP; HC (A15009B)]
Hygroamblystegium tenax (Hedw.) Jenn. [HC (GP1163); PD (GP1206)]
Hypnum curvifolium Hedw. [HC (A15015)]
H. lindbergii Mitt. [HC (GP1160)]
Leptobryum sp. [HC (M13900)]
Leptodictyum riparium (Hedw.) Warnst. [PD (GP1203)]
Leskea gracilescens Hedw. [HP; PD]

Leucobryum glaucum (Hedw.) Aongst. in Fries [HC; PD (GP1188)]
Leucodon julaceus (Hedw.) Sull. [HP; HC (GP1147); PD (GP1200)]
Mnium thomsonii Schimp. [PD (A15027)]
Orthotrichum pumilum Sw. [HC (JT548)]
O. pusillum Mitt. [PD (GP1202)]
Philonotis fontana (Hedw.) Brid. [HC (A15010)]
Plagiomnium ciliare (C. Muell.) T. Kop. [PD (M13924)]
Plagiopus oederiana [PD]
Plagiothecium cavifolium (Brid.) Iwats. [HC]
P. denticulatum (Hedw.) Schimp. in B.S.G. [PD (A15030)]
Platygerium repens (Brid.) Schimp. [HP; PD]
Pogonatum pensilvanicum (Hedw.) P. Beauv. [PD (GP1197)]
Pohlia nutans (Hedw.) Lindb. [HC (GP1159)]
Polytrichastrum ohioense (Ren. & Card.) G. L. Sm. [HC (M13891)]
Polytrichum commune Hedw. (HC (M 13894, 13905)]
Pseudotaxiphyllum elegans (Brid.) Iwats. [PD (A15032; GP1186, 1191)]
Ptychomitrium drummondii (Wils.) Sull. [BT]
Rhabdoweisia crispata (With.) Lindb. [PD (A15028)]
Rhizomnium punctatum (Hedw.) T. Kop. [PD (A15026)]
Rhodobryum roseum (Hedw.) Limpr. [HC]
Schistidium rivulare (Bridel) Podpera [HC (A15012)]
Sematophyllum demissum (Wils.) Mitt. [HC (A15008, 15021; GP1146, 1151, 1158, 1166, 1168, 1171, 1174) PD (GP1194, 1201)]
Sphagnum capillifolium (Ehrh.) Hedw. [HC (A15016; M13907; S3384)]
S. compactum DC. in Lam. & DC. [HC (A15025; M13906; S3383)]
Thamnobryum alleghaniense (C. Muell.) Nieuwl. [PD (A15029)]
Thelia hirtella (Hedw.) Sull. in Sull. & Lesq. [HC (A15013; JT541)]
Thuidium delicatulum (Hedw.) Schimp. in B.S.G. [HC (GP1181); PD (GP1189, 1192)]

Literature Cited

Egan, R. S. 1987. A fifth checklist of the lichen-forming, lichenicolous and allied fungi of the continental United States and Canada. The Bryologist 90: 77-173.

Egan, R. S. 1990. Changes to the "fifth checklist of the lichen-forming, lichenicolous and allied fungi of the continental United States and Canada." Edition II. The Bryologist 93: 211-219.

Anderson, L.E., H. A. Crum & W. R. Buck. 1990. List of the mosses of North America north of Mexico. The Bryologist 93: 448-499.

Anderson, L.E. 1990. a checklist of *Sphagnum* in North America north of Mexico. The Bryologist 93: 500-501.

Stotler, R. & B. Crandall-Stotler. 1977. A checklist of the liverworts and hornworts of North America. The Bryologist 80: 405-428.

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Lichens and Bryophytes of the Rochelle Hills, Campbell County, Wyoming

Alvin L. Medina[1]

Abstract. *A lichen and bryophyte collection was made in 1974 of the Rochelle Hills Escarpment, in which a total of 108 lichens and 31 bryophytes were found. Nearly all species were common to neighboring states.* **Lecidella viridans** *was the only species that has not occurred in literature from adjacent states.* **Usnea hirta** *was the most abundant fruticose lichen in the pine forest, whereas* **Xanthoparmelia chlorochroa** *prevailed on sagebrush grasslands. Species were identified that could be used as biomonitors of regional air quality.*

Previous lichen and bryophyte floras and checklists for Wyoming have been published by Röll (1893), Nelson (1902), Clark and Frye (1931), Porter (1933, 1935). More recent works include those of Wetmore (1968), Hong (1977a) and Churchill (1979, 1982). Hong (1977a) provided a complete listing of early contributors to the Hepaticae of Wyoming. However, most of these collections were from the major mountain ranges of Wyoming.

The purpose of this study was to inventory lichens and bryophytes found in the Rochelle Hills area of east-central Wyoming, as part of a vegetation survey for the greater Cheyenne River Basin. Herein, I report the taxa of lichens and bryophytes which were found, and compare this flora to those of adjacent states and to continental checklists of Egan (1987a, 1987b, 1989) for lichens and Anderson *et al.* (1990) and Stotler and Crandall-Stotler (1977) for bryophytes. In addition, species were identified that could be used as candidates for monitoring regional air quality, given the vast coal, mineral, and petroleum development in the greater Powder River and Cheyenne River Basins.

The nomenclature used is that of Egan (1987a, 1987b, 1989) for lichens and that of Anderson *et al.* (1990) and Stotler and Crandall-Stotler (1977) for bryophytes. Specimens are arranged alphabetically within families and genera. Voucher specimens were deposited as permanent records in the University of Colorado Museum and the University of Wyoming (Rocky Mountain Collection).

STUDY AREA

The habitats of the area have been described in detail by Thilenius *et al.* (in press). The Rochelle Hills are located within T41N, T42N and R69W, west of the town of Rochelle in the southeastern corner of Campbell County. The Rochelle escarpment forms a 90 to

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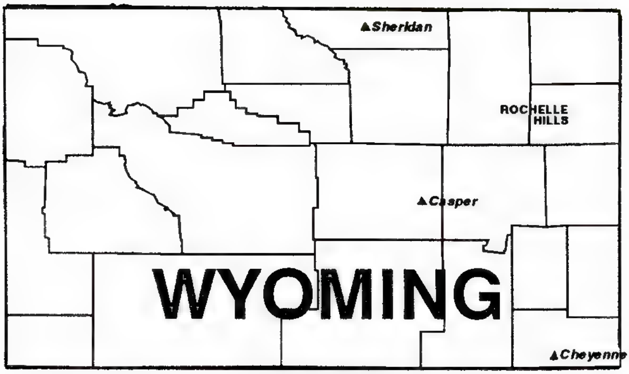

120m high, east facing divide of the unglaciated western section of the Missouri Plateau (Breckenridge *et al.* 1974). Elevations range from 1370m to 1465m. Exposed rocks are of sedimentary origin. The climate is semiarid with great temperature variations between summer and winter (U.S.Department of Interior 1974). Average daily winter temperatures range between -15° to 0.5° C. Summer temperatures will exceed 38°C in late summer. Most rainfall occurs in spring and early summer with a annual range of 25 to 35 cm total precipitation. The principal vegetation types on the escarpment include woodland types such as *Pinus ponderosa/Juniperus scopulorum, P. ponderosa/Artemisia tridentata/Agropyron spicatum,* and *Juniperus scopulorum/Agropyron spicatum-Calamovilfa longifolia.* Riparian habitats are characterized by stands of *Populus sargentii/Symphoricarpos occidentalis* and *Sarcobatus vermiculatus/Agropyron smithii-Bouteloua gracilis* in the alkali flats of floodplains. Sagebrush types are characterized by *Artemisia cana* and *A. tridentata* as the dominant shrub, with *Bouteloua gracilis, Agropyron smithii,* and *Calamovilfa longifolia* as the dominant graminoid species.

METHODS

In summer of 1974, the study area was traversed on foot making site selections for collection of specimens. Specimens were collected from nearly all habitats with the aim of making as complete an inventory as possible. The relative abundance and substrate preference of the species were recorded. Each species was photographed in situ for field identification. Collections were identified by Dr. William Weber in the laboratory, indexed, and deposited in herbaria at the University of Colorado, Boulder, Colorado. Collection numbers are provided for each species in parenthesis.

DISCUSSION

Considering the low altitude and general lack of lithological diversity, tree species and protection from summer drought, the lichen and moss flora is about what one would expect, not terribly rich in species, but with a small number of conspicuous species dominating the various major habitats. A number of species one would generally expect in Rocky Mountain forested areas were missing, indicative of the fact that this is a marginal ecosystem for forest cryptogams. Only in the most protected and mesic canyons were a large proportion of the species on the list found.

Many lichen species found were also listed for the Yellowstone National Park area (Eversman 1990), a difference of 900-1000m in elevation, suggesting that the species have a wide ecological amplitude for site conditions. Nearly 75% of the lichen species listed were also listed for Utah (St. Clair *et al.* 1991), 85% for Colorado (Shusan and Anderson 1969), and South Dakota (Wetmore 1968). *Lecidella viridans* was the only species that did not occur in literature from adjacent states. All species of bryophtes, except for 3, were listed for adjoining states (Lawton 1953, Weber 1973, Churchill 1979, Hong 1975, 1977a, 1977b).

Greatest species diversity was evident on two areas. One site was the northwest trending steep canyon slope running down to the Rochelle Road from the USGS bench mark in section 12. A prominent cliff just below the canyon rim evidently intercepts local valley fog from time to time and a fairly rich assemblage of species preferring vertical cliff sites occurs here. There are few such sites comparable to this in the study area. Another area was a juniper grove located at the bottom of this same canyon, just across from a spring. Here high local humidity creates ideal conditions for lichens and mosses growing on the tree trunks and on low cobble on the ground.

Bryophytes are not conspicuous on the Rochelle Hills. The most conspicuous moss on rock outcrops was the cushion moss, *Coscinodon calyptratus*. Within the ponderosa pine habitat, *Polytrichum juniperinum* was most abundant on mesic sites, whereas *P. piliferum* was more locally abundant on drier sites. These same species are generally absent from other habitats in the study area. The richest assemblages of mosses was found on steep north-facing slopes with dense forest and large rock outcrops, but these habitats are limited in extent.

Two species of liverworts *Cephaloziella divaricata*, and *C. rubella* were found to be locally abundant, whereas, *Riccia macallisteri* was rare. These species are common to all neighboring states.

From the standpoint of environmental monitoring, the surface outcrops of sandstone and natural brick which comprise the rim of the escarpment, support the most conspicuous lichen communities. These species include: *Rhizoplaca chrysoleuca, Umbilicaria torrefacta, Dimelaena oreina, Lecanora rupicola, Lecidea atrobrunnea, L. tessellata*, and

Xanthoria elegans. *Xanthoparmelia chlorochroa*, a fruticose lichen, is the species of choice due to its relative abundance within sagebrush grassland habitats. Erdman and Gough (1977) have also selected this species as an indicator for geochemical fallout in the Powder River Basin. *Rhizoplaca melanophthalma*, another common species found on the escarpment, has been used as a biomonitor of atmospheric pollution in Idaho (Rope and Pearson 1990). In the ponderosa pine habitats, *Usnea hirta* was most abundant and is the species of choice. It is recommended that environmental monitoring studies using these species should be concentrated on the exposed summit rock outcrops and soils of the sagebrush grassland. Air quality monitoring studies using lichens require a large area over which lichen species are in excellent health, based on such attributes as, robustness of vegetative growth, presence of apothecia, etc. The forest habitats examined exhibit less than optimum conditions of shade, moisture and protection from summer drought, thus the occurrence of lichens is also limited.

Lichens

Acarospora badiofusca. Found once, in joint plane crevices of north-facing cliffs (1).

Acarospora chlorophana. Infrequent, occurring only on vertical faces of high outcrops and cliffs (2).

Acarospora fuscata. Very common on outcrops (3, 104, 114).

Acarospora schleicheri. Frequent on bare soil in sagebrush areas, and occasionally on rock outcrops (6, 7).

Acarospora smaragdula. Very common on rocks and extremely polymorphic (4, 5).

Arthonia glebosa. Inconspicuous and uncommon on soil in the sagebrush areas (36).

Aspicilia alphoplaca. Rare in the area, on various rocks including sandstone and shale (33).

Aspicilia caesiocinerea. Abundant gray to whitish crust on rock outcrops (38).

Aspicilia calcarea. On shale and pebbles near the surface of the ground; not conspicuous but fairly common on the slope of the escarpment (20).

Aspicilia cinerea. Found only on cliffs of north-facing slopes (110).

Bacidia bagliettoana. Infrequent (106).

Bryoria chalybeiformis. Frequent but not common, on bases of pines and on trunks and twigs in more humid sites (8).

Buellia erubescens. Common on wood of dead or self-pruned pine branches (122).

Buellia polyspora. Infrequent and so minute as to be overlooked. Usually occurring on wood, we only found this on a few stones (116).

Buellia retrovertens. Rare in the area, found only once on a small stone (10).

Caloplaca citrina. Infrequent on low rather small red brick stones around bases of rock outcrops in the sagebrush on the upper rim (11).

Caloplaca decipiens. Infrequent on soft sandstone or brick (19).

Caloplaca epithallina. Rare (62).

Caloplaca herbidella. Infrequent and very inconspicuous on pine bark (100).

Caloplaca microphyllina. Infrequent on weathered pine wood (119).

Caloplaca sipeana. Frequent on horizontal surfaces of smooth rocks of the rim (12).

Caloplaca tiroliensis. Rare and over-growing decayed moss and plant detritus on forested north slopes (98).

Candelariella aurella. Rare, found once on shale in ravine, north slope (94).

Candelariella deflexa. Common on cottonwood bark, Cheyenne River floodplain, but very small to invisible (97).

Candelariella rosulans. The most common *Candelariella* on outcrops of the rim (93).

Candelariella vitellina. Not as common as *C. rosulans*, but found on similar substrates (96).

Catapyrenium lachneum. Common soil lichen of the sagebrush areas (76).

Catapyrenium plumbeum. Infrequent, on sandstone of outcrops on the rim (50).

Chromatochlamys muscorum. Infrequent on north-sloping ravines (99).

Cladonia cariosa. On sloping ground of north-facing ravines, uncommon (17).

Cladonia chlorophaea. Common on forest floors where late snow has lain (77).

Cladonia coniocraea. Infrequent on forest floor on north slopes (41).

Cladonia pyxidata. Frequent on forest floor, north slopes (89).

Collema tenax. Common on soils in the sagebrush areas (84).

Cyphelium tigillare. Infrequent, on dry wood of branches, stumps and trunks of pine (32).

Dimelaena oreina. Omnipresent, occurring on almost every sunny exposed rock outcrop (26).

Diploschistes actinostomus. Rare, found once on cliffs of north slope (71).

Diploschistes scruposus. Infrequent, over-growing plant debris on soil (22).

Diplotomma alboatrum. Very rare here, found on shale in a north-facing ravine bottom (9).

Flavopunctelia soredica. Common on the bark of pines (60).

Hypocenomyce friesii. Common on dry wood of conifers (78).

Hypocenomyce scalaris. Frequent on burned wood of conifers (58).

Hypogymnia physodes. Infrequent on pines, especially near the base of the trunk, on the moist side (14).

Lecanora argopholis. Infrequent on surface outcrops of the rim (39).

Lecanora caesiorubella. Infrequent, on bark of juniper near the spring (120).

Lecanora garovaglii. Fairly common on surface outcrops of the rim (65, 91).

Lecanora hagenii. Common but inconspicuous lichen of wood and bark of pines, junipers and cottonwoods (102, 125).

Lecanora muralis. Common on fine-grained white sandstones (27).

Lecanora rupicola. Abundant on the outcrops of the upper rim (13).

Lecanora saligna. A very common nondescript lichen of dry wood of conifers (87).

Lecidea atrobrunnea. Frequent but never dominant on the surface outcrops of the rim (30).

Lecidea berengeriana. Infrequent on decaying plant detritus, moss etc., on the ground on steeply sloping north exposures (127).

Lecidea tessellata. Common on sunny exposures of rock outcrops of the upper rim. Frequent in protected underhangs of soil terraces or cliffs (28, 66, 105).

Lecidella carpathica. Abundant on surface rocks and outcrops of the upper rim (29).

Lecidella euphorea. Very common on bark of pines and junipers (118).

Lecidella stigmatea. Frequent on pebbles of forest openings (123).

Lecidella viridans. Common on surface outcrops but nowhere conspicuous or dominant (42).

Lepraria membranacea. Frequent in protected underhangs of soil terraces or cliffs (67).

Letharia vulpina. Infrequent on wood and twigs of pines (59).

Melanelia granulosa. Rare on north-facing cliffs (63).

Melanelia incolorata. Abundant on the bark and wood of pines (47).

Melanelia infumata. Frequent on vertical cliffs and sometimes on juniper bark (107).

Melanelia subolivacea. Common on twigs and sapling trunks of pines (18).

Melanelia substygia. Rare in our area. Found only on cliffs of north-facing canyon-head (35).

Neofuscelia loxodes. A dominant brown lichen on surface rock outcrops of the rim. Common on twigs and sapling trunks of pines (40).

Pannaria pezizoides. Found only once on the ground on north-sloping ravines (61).

Parmelia sulcata. Infrequent on the bases of pine trunks in moister sites (21).

Parmeliopsis ambigua. Infrequent on bark at the bases of pines in the most mesic sites (57).

Parmeliopsis hyperopta. Same sites as previous specie (45).

Peltigera canina. Frequent in needle litter on the ground on moister slopes in forested ravines (55).

Peltigera malacea. Infrequent, only in the most mesic north-facing forested slopes, on ground in litter (52).

Peltigera polydactyla. Fairly common on mesic north-facing forested slopes, on ground in litter (48).

Peltigera rufescens. Frequent on relatively dry forested slopes (55).

Peltigera venosa. Infrequent, on fairly fresh vertical clay exposures of terraces on slopes of ravines (49).

Pertusaria saximontana. Infrequent on dry wood of pines (54).

Phaeophyscia orbicularis. Abundant on trunks of cottonwoods along the Cheyenne River floodplain (85, 109).

Phaeophyscia sciastra. Infrequent but locally common on north-facing cliffs (75).

Physcia adscendens. Abundant on deeply shaded trunks of junipers near the spring (95).

Physcia aipolia. Frequent on the bark of junipers near the spring (43).

Physcia caesia. Locally abundant on the vertical faces of north-facing cliffs (44, 70).

Physcia callosa. Infrequent, confined to the vertical faces of north-facing cliffs (37).

Physcia dubia. Rare, found only once on cracks in bedding planes of shale outcrop in the bottom of a north-facing ravine (108).

Physcia phaea. Rare, occurring only on the vertical surfaces of north-facing cliffs (115).

Physcia tribacia. Locally abundant on the trunks of deeply shaded junipers near the spring (111).

Physconia grisea. Infrequent, on north-facing cliffs (69).

Physconia muscigena. Infrequent, on soil accumulation on the lips of north-facing cliffs (92).

Psora luridella. Infrequent, on bare soil of the sagebrush areas (79).

Psora russellii. Infrequent on thin soil over sandstone rocks, surface outcrops of the rim (74).

Ramalina intermedia. Rare, found only on the vertical faces of north-facing cliffs (53).

Rhizocarpon disporum. Fairly common on sandstone and brick of the outcrops of the rim (46).

Rhizocarpon riparium. Generally rare over the site but locally abundant on hard rock, vertical surfaces of north-facing cliffs (23).

Rhizoplaca chrysoleuca. Common on the rock outcrops of the rim (31).

Rhizoplaca melanophthalma. Common on surface outcrops of the rim (73).

Rinodina exigua. Very inconspicuous on trunks of pine (117).

Rinodina sp. (on cottonwood). On cottonwoods on the Cheyenne River floodplain. See note under preceding entry (124).

Rinodina sp. (on juniper). Inconspicuous but common on the trunks of shaded junipers near the spring (121).

Sarcogyne clavus. Infrequent, on pebbles weathering out of steep hillside in openings of pine forest alongside a trail (90).

Spilonema revertens. Rare, a few thalli found in cracks in joint planes of north-facing cliff (112).

Staurothele clopima. Common on pebbles on the summits of low mesas above the Cheyenne River crossing (103).

Tephromela atra. Rare, found once on cliffs of north slope (72).

Trapeliopsis granulosa. Common on wood of fallen and often burned trunks of pines (51).

Tuckermannopsis chlorophylla. Rare, found only on one fallen pine and one standing pine nearby, in a moist north-facing ravine (16).

Umbilicaria torrefacta. Abundant on surface outcrops of the rim (34).

Usnea hirta. Common on pine trunks and twigs in moister sites (15).

Verrucaria sp. Several species were found on pebbles weathering out of steep hillside in pine forest openings, and on low rocks in the seasonal streamlet near the spring (113, 126).

Xanthoparmelia chlorochroa. Abundant on soil of the sagebrush grassland of the rim (64).

Xanthoparmelia taractica. Infrequent on cliffs of the north-facing escarpment (83).

Xanthoria elegans. Abundant and very conspicuous on exposed sunny rock outcrops everywhere (24).

Xanthoria fallax. Frequent on bark of junipers in shade near the spring, occasional on rock of vertical north-facing cliffs, and abundant on woody trunks of *Sarcobatus* bushes on the Cheyenne River floodplain (88).

Xanthoria polycarpa. Abundant on woody trucks of *Sarcobatus* bushes near the Cheyenne River floodplain (86, 101).

Mosses

Amblystegium serpens. Found only once, on wet rocks in the sedge swale below the spring (223).

Barbula unguiculata. Found only once, on slope just above ravine bottom on north slope (222).

Brachythecium fendleri. Common on moist slopes of gulches and ravines (208).

Brachythecium nelsonii. Locally abundant in the sedge swale just below the spring, in saturated soil or mud (227).

Bryum argenteum. Common on ground that bakes dry in summer, in the sagebrush areas and summit rocky sites (212).

Bryum caespiticium. Probably the most abundant moss ground cover in the sagebrush areas and on dry open ground that is very dry in summer (202).

Bryum capillare. Infrequent, on rocks around the spring sedge meadow, and on moist sides of ravines on north slopes (221).

Ceratodon purpureus. A characteristic moss of disturbed, often burned, sites, particularly where trees have been uprooted, trails cut into slopes (215).

Coscinodon calyptratus. Abundant on summit rock outcrops (216).

Desmatodon plinthobius. Infrequent, found on moist shaded rocks in seasonally inundated site under junipers just below the spring (213).

Dicranum tauricum. Infrequent, only in optimally mesic sites such as moist north-facing ravines, where it occurs on the decaying wood of fallen trees usually facing down slope (217).

Encalypta vulgaris. Infrequent, usually found in crevices between or under rocks (201).

Eurhynchium pulchellum. Locally abundant ground cover on north-sloping steep sides of ravines in the most mesic forested sites (205).

Grimmia anodon. Occurring on north-facing vertical cliffs (218).

Homalothecium nevadense. Locally abundant on cliff-sides on north-facing slopes of the highest altitudes (203).

Hypnum revolutum. Locally abundant in the vicinity of large outcrops of cliffs (209).

Hypnum vaucheri. Occurring on drier sites, usually in areas of rock outcrops and north exposures (210).

Orthotrichum hallii. Infrequent, on low stones in shade of junipers near the spring (229).

Orthotrichum laevigatum. Infrequent on vertical cliffs of the north-facing escarpment (231).

Physcomitrium hookeri. Found only once, on a wet hummock in the sedge mat just below the spring (220).

Pohlia cruda. In north-facing ravines, usually occurring in underhanging soil terraces in shaded and protected sites (211).

Pohlia nutans. Fairly common along the sides of the watercourse in the deep ravines on the north slopes, but not straying far from availability of seasonal moisture (230).

Pohlia wahlenbergii. Common on sedge mats near springs (214).

Polytrichum juniperinum. Infrequent on north-sloping land in the pine forest (207).

Polytrichum piliferum. In openings in the forest, particularly on gravely dry soils (219).

Pterygoneurum sp. A small sterile specimen found under a greasewood bush near the Cheyenne River-Rochelle Road ford (228).

Tortula mucronifolia. Found in moist areas at the bottoms of ravines where water reaches the plants at some time of the season (204).

Tortula ruralis. The dominant plant on the ground in sagebrush habitats and in the pine forest where snow accumulates (206).

Hepatics

Cephaloziella divaricata. Locally abundant on a patch of steeply sloping ground on north-facing ravine (224).

Cephaloziella rubella. Probably locally abundant on bare earth openings, slight slope, on lips of escarpment, growing as insignificant blackish patches along with *Riccia macallisteri* (225).

Riccia macallisteri. Rare or inconspicuous, on bare earth seasonally moist following snow-melt in spring, on lips of escarpment (226).

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Literature Cited

Anderson, L. E., H. A. Crum, and W. R. Buck. 1990. List of the mosses of North America north of Mexico. *The Bryologist* 93(4): 448-499.

Breckenridge, R. M., G. R. Glass, F. K. Root, and W. G. Wendell. 1974. *Campbell County, Wyoming: Geological maps, atlas and summary.* The Geological Survey of Wyoming in cooperation with the Mineral Division, Wyoming Department of Economic Planning and Development and U.S. Bureau of Mines. 10 maps.

Churchill, S. P. 1979. Mosses of the Great Plains III.: Additions to Nebraska and the Black Hills of South Dakota and Wyoming. *The Bryologist* 82(1): 72-75.

Churchill, S. P. 1982. Mosses of the Great Plains VIII.: Additions. *The Bryologist* 85(2): 218-221.

Clark, L. and T.C. Frye. 1931. Liverworts new to Wyoming and Washington. *The Bryologist* 34: 82.

Egan, R. S. 1987a. A fifth checklist of the lichen-forming, lichenicolous and allied fungi of the continental United States and Canada. *The Bryologist* 90(2): 77-173.

Egan, R. S. 1987b. Errata. *The Bryologist* 90(2): 282.

Egan, R. S. 1989. Changes to the fifth checklist of the lichen-forming, lichenicolous and allied fungi of the continental United States and Canada: Edition I. *The Bryologist* 92(1): 68-72.

Erdman, J. A. and L. P. Gough. 1977. Variation in the element content of *Parmelia* chlorochroa from the Powder River Basin of Wyoming and Montana. *The Bryologist*

80(2): 292-303.

Eversman, S. 1990. Lichens of Yellowstone National Park. *The Bryologist* 93(2): 197-205.

Hong, W. S. 1975. Hepaticae of the Black Hills, South Dakota. *The Bryologist* 78(2): 211-212.

Hong, W. S. 1977a. An annotated checklist of the Hepaticae of Wyoming. *The Bryologist* 80(4): 480-491.

Hong, W. S. 1977b. Thalloid Hepaticae of Montana and phytogeographical relationships to neighboring states and provinces. *The Bryologist* 80(2): 270-278.

Lawton, E. 1953. Mosses of the Black Hills, South Dakota. *The Bryologist* 56(1): 116-121.

Nelson, A. 1902. The cryptogams of Wyoming. Pages 1-38 in *Tenth Annual Report of the Wyoming Experiment Station*, University of Wyoming, Laramie, WY.

Porter, C. L. 1933. The bryophytes of Wyoming: Part I. Hepaticae. *The Bryologist* 36(1): 5-8.

Porter, C. L. 1935. Bryophytes of Wyoming: Part II. Hepaticae (concluded) and Musci. *The Bryologist* 38(6): 101-114.

Röll, J. 1893. Nordamerikanishe Laubmoose, torfmoose und lebermoose. C. Lebermoose (Hepaticae). *Hedwigia* 32: 398-402.

Rope, S. K. and L. C. Pearson. 1990. Lichens as air pollution biomonitors in a semiarid environment in Idaho. *The Bryologist* 93(1): 50-61.

Shusan, S. and R. A. Anderson. 1969. Catalog of the lichens of Colorado. *The Bryologist* 72(4): 451-483.

St. Clair, L. L., C. C. Newberry, and G. T. Nebeker. 1991. Catalog of the lichens of Utah. *Mycotaxon* 15: 199-264.

Stotler, R. and B. Crandall-Stotler. 1977. A checklist of the liverworts and hornworts of North America. *The Bryologist* 80(3): 405-428.

Thilenius, J. F., G. R. Brown, and A. L. Medina. (in press). *Vegetation on semi-arid rangelands, Cheyenne River Basin, Wyoming*. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO. RM-GTR-00.

U.S. Department of Interior. 1974. *Final environmental statement: Proposed development of coal resources in the Eastern Powder River Coal Basin of Wyoming*. Joint Report U.S. Department of Agriculture, Interstate Commerce Commission, Department of Interior. 6 vols., illus.

Weber, W. A. 1973. Guide to the mosses of Colorado: Keys and ecological notes based on field and herbarium studies. Institute of Arctic and Alpine Research. *Occasional Paper* No. 6. University of Colorado. 48pp.

Wetmore, C. M. 1968. Lichens of the Black Hills of South Dakota and Wyoming. *Publications of the Museum, Michigan State University, Biology Series* 3(4): 213-464.

Additions to the Lichen Flora of Missouri

Douglas Ladd[1], Gerould Wilhelm[1], and Richard C. Harris[2]

During the past decade, field work throughout the state has begun to provide an understanding of Missouri's lichen flora (*e. g.* Ladd & Wilhelm 1986, Ladd 1991). This work has resulted in the documentation of numerous lichens previously unreported from the state. Here we report eighty-three species of lichens new to Missouri, including information about substrate, habitat, and distribution. Specific discussions regarding taxonomy, chemistry, and rangewide distribution are included where appropriate.

In the following list, lichens are arranged alphabetically, generally following the nomenclatural concepts expressed in Egan (1987). Each species includes a brief summary of substrate and habitat, followed by an alphabetical list of Missouri counties from which that lichen has been documented, with collection information. Only one collection is listed per county, regardless of how many specimens exist from that county. Collector names are provided, except for those of the authors, which are identified by letter only (*H*, *L* or *W*). Unless indicated by a standard herbarium acronym in parentheses following the specimen citation, all collections are deposited in the Morton Arboretum herbarium (MOR), except for those of Harris, which are deposited in the New York Botanical Garden herbarium (NY). Dates are provided only for those collections made prior to 1980.

Acarospora americana H. Magn. Known only from an exposed sandstone ledge. — ST. CLAIR *L 16962.*

Anisomeridium biforme (Borrer) R. C. Harris Occasional on trees in open woodlands. — PLATTE *W 15936;* ST. LOUIS *W 14326;* SCOTLAND *L 17208B;* VERNON *L 16936.*

Arthonia punctiformis Ach. A relatively frequent but inadequately vouchered species of smooth bark. — WORTH *W 15893.*

Arthonia rubella (Fée) Nyl. Known from *Acer rubrum* on a north-facing slope. — CARTER *H 25673.*

Arthothelium spectabile Flot. *ex* A. Massal. Our records are from *Acer saccharum* and *Carya ovata* in woodlands. — BARRY *L 16345;* BOONE *Berry 312, 1936* (UMO); MORGAN *L 9996;* PERRY *Demetrio 26, 1886* (NY); PULASKI *L 12576;* STONE *W 15734;* VERNON *L 13138A.*

Arthothelium taediosum (Nyl.) Müll. Arg. Occasional to locally common, most frequently on *Acer rubrum* and *Quercus* subgenus *Erythrobalanus.* — BARRY *L 16348;* BUTLER *Summers 3137;* CARTER *H 21734;* PHELPS *L 16296;* SHANNON *L 17199.*

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Aspicilia verrucigera Hue Occasional on shaded igneous or sandstone rocks in the Ozarks, especially in upland woods. We are not fully comfortable with this group of *Aspicilia* species in Missouri, but those containing stictic acid and growing in upland sites have been defaulted here. — PHELPS *L 16985;* ST. CLAIR *H 21311;* WAYNE *L 17085.*

Bacidia bagliettoana (A. Massal. & de Not. *in* A. Massal.) Jatta Known from exposed loess in a sparsely vegetated, west-facing hill prairie in extreme northwestern Missouri. — ATCHISON *L 15162.*

Bacidia polychroa (Th. Fr.) Körb. Known from *Juglans nigra* and *Fraxinus* in open woodlands. — NEWTON *Wetmore 69245* (NY); PHELPS *L 17656.*

Buellia polyspora (Willey) Vain. Frequent on a wide variety of corticolous substrates, often on trees in old fields and pastures. — AUDRAIN *L 17024;* BARTON *L 14015;* BOONE *L 15858;* DUNKLIN *L 16132;* GRUNDY *W 16108;* JEFFERSON *L 17926;* KNOX *W 13289;* PHELPS *L 17573;* PULASKI *L 16261;* RIPLEY *L 15970;* ST. FRANCOIS *L 14211;* STE. GENEVIEVE *L 11574;* ST. LOUIS *L 15925;* VERNON *L 16947;* WARREN *Summers 2486.*

Buellia turgescens Tuck. Known only from exposed sandstone bedrock in an extensive prairie. — BARTON *L 17491.*

Buellia vernicoma (Tuck.) Tuck. On lightly shaded sandstone and rhyolite, almost invariably associated with *Pertusaria plittiana* or *Phlyctis argena* — JEFFERSON *L 17938;* OZARK *L 17113;* PHELPS *L 17157;* ST. CLAIR *L 17739;* WAYNE *L 17087.*

Caloplaca atroalba (Tuck.) Zahlbr. On partly shaded carbonate rock. — DAVIES *W 16019;* ST. LOUIS *L 15822.*

Candelariella reflexa (Nyl.) Lettau Occasional on a wide variety of corticolous substrates, often on shrubs and small twigs of slow-growing trees in exposed sites. Egan (1987) does not mention this species for North America. Harris & Buck (1978) describe *Candelariella efflorescens*, a species with a thallus of granulose areoles which soon break down into small soralia and produce asci with 32 spores. According to their map, *C. efflorescens* occurs in the north-central and eastern United States, with a few western outliers. They allude to an element in the western United States which is similar but has 8-spored asci, and speculate that it may be *C. reflexa* or an undescribed species. All of our fertile material produces asci with 8 spores and are tentatively referred to *C. reflexa.* A majority of midwestern material is sterile, but since every fertile specimen from Illinois and Missouri we have seen has 8 spores, we are referring sterile material to *C. reflexa* for the time being. This raises some interesting questions regarding the distribution of *C. reflexa* and *C. efflorescens* in Missouri, as well as the ranges of the two species in North America. Only fertile material is cited here. — BOONE *L 15864;* COLE *L 18064;* JEFFERSON *L 17929;* IRON *H 31137*; OSAGE *L 12521;* PHELPS *L 17582;* ST. FRANCOIS *L 14046;* SHANNON *L 14836;* STONE *Summers 2623.* **Illinois**: ADAMS *Jones 2089;* HARDIN *W 17804;* JOHNSON *W 18109;* UNION *L 17730.* There are also specimens from **Arkansas**: BOONE *Dodge et al. s.n. 7 April*

1939; GREENE *L 16094;* IZARD *H 21658* - and **Florida**: SANTA ROSA *W 14486.*

Chaenotheca brunneola (Ach.) Müll. Arg. Known from a single locality, on *Quercus.* — CARTER *Buck 18115* (NY).

Cladonia cylindrica (A. Evans) A. Evans Common, mostly on shaded rock, humus and lignum. — ADAIR *W 13310;* BOONE *L 12603;* CAPE GIRARDEAU *W 10451;* CARTER *H 25635;* CHRISTIAN *L 9111;* CLARK *Schuette 877;* GASCONADE *L 10351;* HENRY *L 13914;* IRON *L 14416;* JEFFERSON *W 11213;* LACLEDE *L 7910;* LEWIS *W 13150;* MADISON *L 10324;* MARION *Schuette 831;* MONTGOMERY *L 10648;* OREGON *L 7593;* OSAGE *L 12506;* PIKE *Schuette 1009;* PULASKI *L 8192;* REYNOLDS *L 11097;* ST. CHARLES *L 12720;* ST. FRANCOIS *Summers 1707;* ST. LOUIS *W 10731;* SHANNON *L 10193;* TEXAS *L 9204;* WARREN *L 10596;* WASHINGTON *L 10670;* WAYNE *L 6602.*

Cladonia simulata Robbins Known from a single collection on well-drained rocky soil. This species resembles *Cladonia piedmontensis* G. Merr., but lacks usnic acid and contains fumarprotocetraric acid. According to Thomson (1967), this is an endemic species of the North American coastal plain from Massachusetts to Florida. — HOWELL *W 10960.*

Clauzadea monticola (Ach. *in* Schaer.) Haffelner & Bellem. Uncommon on exposed dolomite in high quality glades in the Ozark region. — FRANKLIN *L 15911;* JEFFERSON *L 12753;* PHELPS *L 17588;* SHANNON *L 13649.*

Collema pustulatum (Ach.) Ach. Occasional on shaded dolomite in remnant natural areas; infrequently on sandstones intercalated with dolomitic bedrock. — BARRY *L 13058;* HOWELL *W 10977;* PHELPS *L 17968;* STONE *W 15733.*

Cystocoleus ebeneus (Dill.) Thwaites Apparently rare; restricted to sheltered, shaded, sandstone faces under overhangs. — CALLAWAY *L 11153;* JEFFERSON *L 13119.*

Dimerella sp. #1 Rare, but perhaps overlooked, on trunks of *Quercus stellata* and *Q. velutina* in upland woods. This species resembles *D. lutea* (Dicks.) Trevis., but the ascospores are notably larger, ranging up to 14 μ long. — PHELPS *L 18019A.*

Diploschistes actinostomus (Pers.) Zahlbr. Confined to partly shaded or exposed silicious rocks, especially sandstone. — CARTER *H 31244;* LACLEDE *L 17149;* PHELPS *L 17620;* REYNOLDS *H 31244;* ST. CLAIR *L 16965;* SHANNON *H 25571;* STONE *W 15632;* TANEY *L 14853.*

Diploschistes muscorum (Scop.) R. Sant. Occasional, usually on *Cladonia* squamules in exposed sites, as well as on mosses. The Stone County specimen occurred on a charred root of an old-growth *Juniperus virginiana.* — BOLLINGER *L 12895A;* DADE *L 14857;* GREENE *L 8475;* OSAGE *L 12504;* SHANNON *L 13576;* ST. CLAIR *L 13879;* ST. LOUIS *W 14334;* STE. GENEVIEVE *L 11426;* STONE *L 12438* (MOR, NY).

Diploschistes scruposus (Schreb.) Norman Occasional on exposed sandstone. — DADE *L 12081;* GREENE *Summers 1716;* IRON *L 17669;* MONITEAU *L 12486;* ST. CLAIR *L 16954.*

Fuscidea recensa (Stirt.) Hertel, V. Wirth & Vêzda Known from a single locality, on sandstone. — STE. GENEVIEVE *H 25986.*

Gomphillus americanus Essl. Known only from a high-quality, massive igneous talus slope above the Black River, on mats of *Leucodon jullaceus* on the trunk of an old growth *Juniperus virginiana*. — REYNOLDS *L 17711*.

Gyalecta jenensis (Batsch) Zahlbr. Known only from a north-facing dolomite bluff. — CALLAWAY *Summers 2608*.

Hypocenomyce anthracophila (Nyl.) P. James & Gotth. Schneid. Known only from a charred stump on a wooded, south-facing slope. — IRON *L 17691*.

Hypocenomyce friesii (Ach. *in* Liljeblad) P. James & Gotth. Schneid. Known only from a charred stump on a north-facing slope, in the same locality as the previous species. — IRON *H 31149*.

Julella fallaciosa (Stizenb. *ex* Arnold) R. C. Harris Probably more common than collection records indicate; on trees in open woodlands. — IRON *L 17677;* PERRY *Demetrio 16, 1886* (NY); PHELPS *L 17426;* ST. CLAIR *H 21286*.

Lecanora caesiorubella Ach. ssp. **prolifera** (Fink *in* J. Hedrick) R. C. Harris Occasional on deciduous trees in open woods in the eastern Ozarks. — CARTER *H 25654;* IRON *H 31131;* OZARK *L 17127;* REYNOLDS *L 14129;* RIPLEY *L 12272;* SHANNON *L 17186;* WAYNE *L 17092*.

Lecanora cinerofusca H. Magn. var. **appalachensis** Brodo On sandstone in the eastern Ozarks. — OREGON *H 21695;* SHANNON *Buck 18179* (NY).

Lecidea botryosa (Fr.) Th. Fr. Infrequent; on *Juniperus virginiana*. — IRON *H 31120;* JEFFERSON *H 25049*.

Lepraria caesioalba (B. de Lesd.) J. R. Laundon Known from an exposed sandstone boulder. This species has a granular, grayish-white thallus, and contains fumarprotocetraric acid. — STE. GENEVIEVE *H 25998*.

Lepraria lesdainii (Hue) R. C. Harris Confined to shaded, sheltered faces of carbonate cliffs. This species is characterized by a greenish-gray thallus, and contains lesdainin, a terpene with an RF value just above zeorin. — CASS *L 11607;* CLARK *Schuette 880;* ST. CLAIR *L 17743;* ST. LOUIS *W 14292*.

Lepraria neglecta (Nyl.) Lettau Rare on exposed sandstone and rhyolite, forming large patches of powdery gray thallus. This species contains alectorialic acid. — IRON *H 21791;* JEFFERSON *L 17932;* PHELPS *L 17980;* ST. CLAIR *L 16953;* SHANNON *H 25792*.

Lepraria nivalis J. R. Laundon On lightly shaded, siliceous rocks. This species has a bright whitish-grey chinky-leprose thallus, containing atranorin and protocetraric acid. — IRON *L 14426;* MADISON *L 12951;* PHELPS *L 17766;* STE. GENEVIEVE *W 13676*.

Lepraria sp. #1 Common in Missouri is a bluish-gray, thinly leprose *Lepraria* with atranorin and zeorin only. It occurs on a wide variety of shaded corticolous substrates throughout the state, as well as rarely on mossy rocks. Insofar as we are able to determine, this lichen has yet to be described. It is nearly as common as *L. lobificans* Nyl. [long known as *L. finkii* (B. de Lesd.) R. C. Harris], which has a thicker thallus, contains stictic and constictic acids in addition to atranorin and zeorin, and grows regularly on rocks as well as on trees. — ATCHISON *L 11686;* BUCHANAN *L 12286;* CLAY *L 11636;* CLINTON *L 13945;* COLE *L 11991;* DADE *L 12061;* GENTRY *L 10968;* GREENE *W 15596;* HENRY *L 13896;* HOLT *W 15949;* JEFFERSON *L 12731;* LAFAYETTE *L11482;* MADISON *L 12938;* MONITEAU *L 12476;* MONTGOMERY *L 10649;* NODAWAY *W 15915;* OSAGE *W 15785;* PETTIS *W 15184;* PHELPS *L 17657;* POLK *SUMMERS 1791;* RIPLEY *Summers 2574;* ST. CHARLES *L 10267;* ST. LOUIS *W 14275;* STE. GENEVIEVE *L 11583;* SALINE *L 13956;* SCOTLAND *L 17211;* SHANNON *L 17181;* STONE *W 15641;* SULLIVAN *L 11329.*

Leproloma vouauxii (Hue) J. R. Laundon Rare on sheltered sandstone faces in exposed areas. This species is characterized by a chinky-granular, gray-green thallus with yellowish subtones, reacts KOH+ grape colored, and produces a purple spot with Rf classes of 1/2/1 on TLC plates. — PULASKI *L 16270.*

Leptogium azureum (Sw.) Mont. Known from a single locality, on thin sandy soil over chert. — ST. CHARLES *W 11826.*

Leptogium minutissimum (Flörke) Fr. Known only from the base of *Carya ovata.* — BOONE *L 15846.*

Lithothelium hyalosporum (Nyl.) Aptroot Known from a north-facing slope, on *Fraxinus* — CARTER *H 25506.*

Micarea peliocarpa (Anzi) Coppins & R. Sant. Known from shaded sandstone in the Ozark region. — IRON *H 21776;* PHELPS *L 17759;* REYNOLDS *Buck 24209* (NY); SHANNON *H 21776* (NY).

Micaria prasina Fr. Occasional, but probably overlooked, on rotting wood. — CARTER *Buck 15917* (NY); IRON *Buck 24174* (NY).

Mycobilimbia sabuletorum (Schreb.) Hafellner Known from shaded mosses over rocks and bases of trees. — CARTER *H 25509;* JEFFERSON *H 25400;* MARIES *L 8507;* SHANNON *H 25963.*

Mycocalicium calicioides (Nádv.) Tibell Known from a single locality, on shaded lignum. — SHANNON *Buck 18159* (NY).

Mycoglaena meridionalis (Zahlbr.) Szatala Although this fungus is not lichenized, it is often mistaken for a lichen in the field, and is included in Egan (1987) as a member of the "lichenicolous and allied fungi". It is locally common on the smooth younger branches of trees, and often grows on *Gleditsia triacanthos.* — AUDRAIN *L 17045;* BOONE *L 15857;* CEDAR *L 15598;* DAVIESS *L 16189;* HOWELL *Summers 2319;* IRON *L 17688;* JEFFERSON *L 17925;* PETTIS *L 16202;* VERNON *L 16951;* WASHINGTON *L 13452.*

Mycoporum pycnocarpoides Müll. Arg. Known only from the trunks of *Quercus coccinea* in an upland woods. — SHANNON *L 17193.*

Nadvornikia sorediata R. C. Harris Known in Missouri only from *Quercus alba,* although in Illinois it grows on *Carya glabra* and *Carya ovata.* — STE. GENEVIEVE *L 11421.* **Illinois:** GALLATIN *W 16926;* WILLIAMSON *W 19152.*

Normandina pulchella (Borrer) Nyl. Known only from the mossy trunk of an old growth *Juniperus virginiana* on a massive igneous talus slope, associated with *Gomphillus americanus*. — REYNOLDS *L 17710.*

Opegrapha atra Pers. Known locally only from the decorticate limbs of old growth *Juniperus virginiana* on a high bluff along the Meramec River. — CRAWFORD *W 20025.*

Opegrapha vulgata *auct. non* (Ach.) Ach. Known from *Acer, Carya* and *Quercus*. — FRANKLIN *H 31096;* IRON *H 31206;* PERRY *Demetrio 12, 1886* (NY); PHELPS *L 17762.*

Parmelia sulcata Taylor The only previous report of this lichen to Missouri is the shaded range map in Hale (1979), which includes the southeastern quarter of the state. This is the first verified report. It was on *Gleditsia triacanthos*. — BOONE *Parker 2474.*

Peltigera elisabethae Gyeln. Occasional; mostly over shaded sandstone or dolomite. — DADE *L 12054;* OREGON *L 11821;* RIPLEY *W 11008;* SHANNON *L 17909;* WARREN *L 10143.*

Pertusaria macounii (I. M. Lamb) Dibben Uncommon; almost always found on the branches of *Juniperus* in natural areas in the Ozark region. — CAMDEN *L 6931;* IRON *L 17667;* SHANNON *H 25758;* STONE *W 15623;* WAYNE *L 17089.*

Pertusaria ostiolata Dibben Infrequent, but occurring on a diversity of trees, including *Carya aquatica, Juniperus virginiana,* and *Quercus stellata,* in diverse woodland habitats. — BOLLINGER *L 12888;* BUTLER *L 14812;* CARTER *H 25533;* CHRISTIAN *L 9171;* OREGON *H 21704;* SHANNON *H 25950.*

Pertusaria pulchella Malme Occasional on deciduous trees. This lichen contains lichexanthone, but is otherwise indistinguishable from *P. velata* (Turner) Nyl., and may not merit recognition as a separate species. — CARTER *H 25696;* OREGON *H 21705;* OZARK *L 17120;* SHANNON *H 25876.*

Pertusaria subpertusa Brodo Known from *Amelanchier arborea, Carpinus caroliniana* and *Celtis* sp. in woodlands. — CARTER *H 25631;* SHANNON *H 25847.*

Pertusaria trachythallina Erichsen Known only from a shaded, old growth *Carpinus caroliniana* along a stream. — SHANNON *L 14109.*

Phaeocalicium polyporaeum (Nyl.) Tibell Epiphytic on bracket fungi; known in Missouri from *Trichaptum biforme* (Fr.) Ryv. — SHANNON *Buck 18126* (NY).

Phlyctis argena (Spreng.) Flot. This lichen, containing norstictic acid as the only lichen substance, occurs regularly on lightly shaded, silicious rocks in the Interior Highlands, usually along stream courses and ravines in natural areas. Most references dsescribe this as a corticolous lichen, but it is only known from saxicolous substrates in the lower Midwest. — REYNOLDS *L 17699;* WAYNE *L 17099.*

Physcia adscendens (Fr.) H. Olivier This northern species may be adventive in Missouri. It is known locally only from weathered marble tombstones in cemeteries. — GRUNDY *L 11347;* LIVINGSTON *L 11306;* STE. GENEVIEVE *L 11355.*

Physconia kurokawae Kashiw. Occasional throughout the state, occurring on both corticolous and saxicolous substrates. This lichen appears ecologically and morphologically identical to the more common *P. detersa*, which differs in lacking gyrophoric acid. Some Missouri populations of *Physconia* appear to be mixtures of the two chemistries, which supports Esslinger's (1985) observation that the two elements sometimes occur together. — ADAIR *W 13174;* CAMDEN *Redfearn 30044;* IRON *W 10384A;* JEFFERSON *L 12665;* KNOX *W 13282;* LAFAYETTE *L 11509;* MARION *Schuette 836;* MILLER *L 6910;* PETTIS *W 15190;* PHELPS *L 8420;* ST. FRANCOIS *L 9511;* SHANNON *W 10487;* WRIGHT *L 8250.*

Porina cestrensis (Tuck. *ex* Michener) Müll. Arg. Occasional on shaded trees and siliceous rocks. This species has been considered mistakenly to be synonomous with *P. pulla* (Ach.) Müll. Arg. — CALLAWAY *L 11151;* CARTER *H 25632A;* DUNKLIN *L 14156;* FRANKLIN *H 31095;* LINCOLN *L 14396;* SALINE *L 8349;* WASHINGTON *L 13424;* WAYNE *L 17088.*

Porpidia tahawasiana Gowan Occasional on sandstone and igneous rock. — REYNOLDS *H 31213;* STE. GENEVIEVE *H 25997.*

Psorotichia schaereri (A. Massal.) Arnold Occasional on exposed limestone, dolomite, and concrete. — BUCHANAN *L 11539;* DADE *L 12163;* GREENE *W 15608;* LEWIS *L 11322.*

Pyrenula cuyabensis (Malme) R. C. Harris Known from a single site, on deciduous trees. — CARTER *Buck 18126A* (NY).

Pyrenula ravenelii (Tuck.) R. C. Harris Known from shaded trunks of *Acer rubrum* and *Carpinus caroliniana.* — CARTER *H 25513.*

Pyrenula subelliptica (Tuck.) R. C. Harris Known from *Acer rubrum* on a north-facing slope. — CARTER *H 25687A.*

Rhizocarpon distinctum Th. Fr. Known from cherty dolomite along an embankment. — GASCONADE *W 17688.*

Rinodina tephraspis (Tuck.) Herre Occasional, but seldom collected, on sandstone and igneous rocks, usually in lightly shaded sites. — IRON *H 31188l;* PHELPS *L 17429.*

Sarcogyne similis H. Magn. Occasional on exposed sandstone ledges and in glades. — CARTER *H 21724;* SHANNON *H 25731.*

Scoliciosporum umbrinum (Ach.) Arnold Known from lightly shaded sandstone outcrops in open woods. — PHELPS *L 17987;* ST. CHARLES *L 12694.*

Strangospora moriformis (Ach.) Stein. Known only from the shaded trunk of *Juglans nigra* in an open upland woods. — PHELPS *L 18038.*

Strigula submuriformis (R. C. Harris) R. C. Harris Occasional on trunks of trees in open woodlands; often on oaks. — ANDREW *L 11259;* AUDRAIN *L 17030;* BARRY *L 13037;* COLE *L 12811;* GRUNDY *W 16102;* HARRISON *W 15887;* RAY *L 12333;* SHANNON *L 17917.*

Thelocarpon laureri (Flot.) Nyl. Known from weathered cedar fence boards and chert fragments in disturbed areas. — PHELPS *L 17881;* ST. LOUIS *L 16976.*

Thelopsis flaveola Arnold Known only from the trunk of *Quercus velutina* in upland woods, associated with *Dimerella* sp. #1. This species is very inconspicuous and certainly overlooked. It is easily recognized by the pale, perithecoid ascomata and asci with numerous, simple, colorless ascospores. It is known from two other sites in North America, in Oklahoma and Virginia. — PHELPS *L 18019B.*

Trapelia involuta (Taylor) Hertel Not uncommon, but infrequently collected, on siliceous cobbles and pebbles in exposed, well-drained sites, often in disturbed areas. — PHELPS *L 17769;* REYNOLDS *L 17694;* ST. CLAIR *H 21264.*

Trypethelium virens Tuck. *ex* Michener *in* Darl. Known only from a small sapling on a wooded slope in the St. Francois Mountain region. — WAYNE *L 17075.*

Verrucaria calkinsiana Servít This is a species of carbonate rocks, sometimes occurring in disturbed sites. It is probably more common than collection data indicate. — LEWIS *W 15579;* ST. LOUIS *L 16978.*

Verrucaria marmorea (Scop.) Arnold Uncommon on exposed carbonate rock, often associated with glades. — BARRY *L 13095;* CHRISTIAN *L 9141;* CLAY *L 11654;* LACLEDE *L 17150;* MONTGOMERY *L 13670;* PHELPS *L 17966;* ST. LOUIS *W 14340;* STONE *L 12445.*

Xanthoparmelia neotaractica Hale Known from a single locality, on igneous rock. According to Hale (1990), this species is similar to *X. somloensis*, but differs in lacking white maculae on the upper cortex and having stictic acid instead of salazinic acid. It differs from *X. cumberlandia* in its more consistently narrow, sublinear lobes, and loose adnation. Hale (1984) reports the species from Arkansas and Oklahoma. — SHANNON *H 25593.*

Xanthoparmelia piedmontensis (Hale) Hale Known only from a massive granitic glacial erratic in a pasture. — SULLIVAN *L* 11016.

Literature Cited

Egan, R. S. 1987. A fifth checklist of the lichen-forming, lichenicolous and allied fungi of the United States and Canada. *Bryologist* 90: 77-173.

Esslinger, T. L. 1985. Studies in the lichen family Physciaceae. VI. Two species new to North America. *Mycotaxon* 23: 219-222.

Hale, M. E. Jr. 1979. *How to know the lichens*, second ed. W.C. Brown Co., Dubuque. *viii* + 246 p.

Hale, M. E. Jr. 1984. New species of *Xanthoparmelia* (Vain.) Hale (Ascomycotina: Parmeliaceae). *Mycotaxon* 20: 73-79.

Hale, M. E. Jr. 1990. A synopsis of the lichen genus *Xanthoparmelia* (Vainio) Hale (Ascomycotina, Parmeliaceae). *Smithsonian Contr. Bot.* 74: *iii* + 250 p.

Harris, R. C. and W. R. Buck. 1978. Lichens of the Mackinac Straits region. II. *Candelariella* Müll. *Arg. Michigan Bot.* 17: 155-161.

Ladd, D. 1991. Preliminary list of the rare and endangered macrolichens of Missouri. *Trans. Missouri Acad.* Sci. 25: 5-12.

Ladd, D. and G. Wilhelm. 1986. New and noteworthy macrolichens from Missouri. *Trans. Missouri Acad. Sci.* 20: 15-22.

Thomson, J. W. 1967. *The lichen genus* Cladonia *in North America.* University of Toronto Press, Canada. *xi* + 172 p. + 26 pl.

A preliminary list of bryophytes from Ramsay Island, Queen Charlotte Islands, Canada

Won S. Hong, John Brandvold Jr., Ed Damon, William Nevins Jr. and Dawn White[1]

Ramsay Island, one of approximately 150 islands that compose Queen Charlotte Islands (52°54'N and 130°-132°W), is located on the north side of Juan Perez Sound, between 52°32'-52°32'N and 131°21'-131°27'W. The island has 23.4 km of shoreline and is approximately 4,557 hectare in size. The island is faced on the north by Ramsay Passage to Hotsprings Island. There are few large cliffs on the island, especially on the southeast and mid-southwest portions, and the highest point is located near the Crombie Point area and reaches 411 m. Steep slopes are found around Crombie Point and Andrew Point, a relatively broad valley has developed on the northwest side of the island, and a flat area occurs on the southeast side of the island.

The weather station nearest Ramsay Island is in Sewell Inlet, within 50 km of the island. The annual mean temperature in Sewell Inlet is 7.6°C (the lowest being 1.1°C in January; the highest, 15.1°C in August). The average winter temperature is 2.2°C, and the average summer temperature is 14°C. The annual mean precipitation is 4168.5 mm (the lowest in July - 108 mm; the highest in October - 671.3 mm). The average winter precipitation is 486 mm; for summers, 120 mm (Seel *et al.* 1990).

Compared with the habitat of Hotsprings Island (Hong *et al.* 1992), bogs are common in Ramsay Island and trees are dominated by *Thuga plicata* (western red cedar), *Tsuga heterophylla* (western hemlock), *Picea sitchensis* (Sitka spruce), *Alnus rubra* (red alder) and *Alnus crispa* subsp. *sinuata* (Sitka alder). The forest floor is covered exclusively with bryophytes: especially abundant are *Dicranum scoparium, Hylocomium splendens, Kindbergia oregana, Rhizomnium glabrescens* and *Rhytidiadelphus loreus.* On tree bark, the following bryophytes are abundant: *Antitrichia curtipendula, Bazzania denudata, Cephalozia bicuspidata, C. lunulifolia, Diplophyllum albicans, Frullania nisquallensis, Isothecium myosurioides, Porella navicularis, Rhytidiadelphus loreus* and *Scapania bolanderi.*

The nomenclature of Musci follows Vitt (1982) and Ireland *et al.* (1987), and that of Hepaticae follows Stotler & Crandall-Stotler (1977) and Grolle (1983a, 1983b). Voucher specimens have been deposited at the herbarium of the College of Great Falls, Montana (GFC), with duplicates available in the herbarium of South Moresby/Gwaii Haanas National Park Reserve, Queen Charlotte City, B.C., Canada. Only one representative specimen of each taxon is cited.

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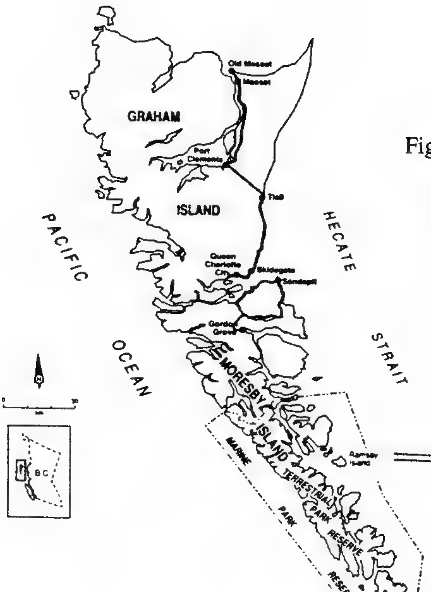

Figure 1. Ramsay Island in Queen Charlote Islands (After Provisional Resource Description & Analysis, South Moresby/Gwaii Haanas National Park Reserve, 1990).

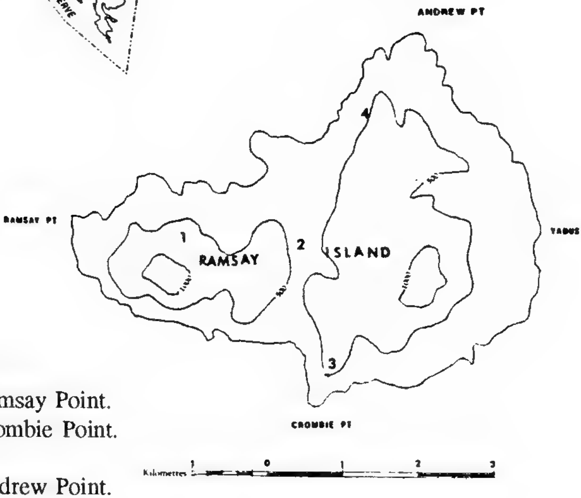

Figure 2. Collecting localities.

1. Tree Farm Campsite - Ramsay Point.
2. Tree Farm Campsite - Crombie Point.
3. Near Crombie Point.
4. Tree Farm Campsite - Andrew Point.

The precise locality data for the collecting sites are as follows. The numbers will identify the collecting sites (Fig. 2) in the subsequent taxonomic list.

1. Tree Farm Campsite - Ramsay Point: 93-1 to 93-124
2. Tree Farm Campsite - Crombie Point: 93-125 to 93-241
3. Near Crombie Point: 93-242 to 93-279.
4. Tree Farm Campsite - Andrew Point: 93-283 to 93-404.

Annotated Checklist of Musci and Hepaticae

Musci

Antitrichia curtipendula (Hedw.) Brid. - bark. 1:11. Abundant on *Thuja plicata.*

Climacium dendroides (Hedw.) Web. & Mohr. - soil. 2:241.

Dichodontium pellucidum (Hedw.) Schimp. - rocks. 1:45.

Dicranum fuscescens Sm. - soil. 4:353.

D. scoparium Hedw. - bark, soil and rocks. 24:148.

Fontinalis hypnoides C. J. Hartm. - aquatic. 1:102.

Heterocladium macounii Best - soil. 4:294.

H. procurrens (Mitt.) Rau & Herv. - decayed wood and rocks. 2:180. In Canada, known only in British Columbia.

Hookeria lucens (Hedw.) Sm. - soil. 2:169. The species always occurs on a wet habitat, usually around a bog in the island. As mentioned by Vitt (1988), *Plagiothecium undulatum* can occur in similar habitats; however, *Hookeria lucens* prefer much wetter area than *Plagiothecium undulatum.*

Hygrohypnum molle (Hedw.) Loeske - soil. 1:86.

Hylocomium splendens (Hedw.) B.S.G. - bark and rocks. 1:15.

Hypnum circinale Hook. - decayed wood and soil. 1:74. In Canada, known only in British Columbia.

Isothecium myosuroides Brid. - bark, branch, decayed wood and rocks. 1:77.

Kindbergia oregana (Sull.) Ochyra - bark, decayed wood and soil, 2:125.

K. praelonga (Hedw.) Ochyra - decayed wood. 4:403,

Plagiothecium undulatum (Hedw.) B.S.G. - decayed wood and soil. 2:141.

Pohlia cruda (Hedw.) Lindb. - soil. 2:171.

P. wahlenbergii (Web. & Mohr) Andr. - soil. 1:90.

Polytrichum formosum Hedw. - soil and rocks. 1:3.

Rhizomnium glabrescens (Kindb.) Kop. - bark. soil and decayed wood. 1:9.

Rhytidiadelphus loreus (Hedw.) Warnst. - bark, decayed wood and rocks. 1:15.

Schistidium maritimum (Turn.) B.S.G. - rocks. 1:18.

Sphagnum girgensohnii Russ. - bark, bog and soil. 1:13.

Tetraphis pellucida Hedw. - bark. 1:89.

Ulota obtusiuscula C. Müll. & Kindb. ex Mac. & Kindb. - branch. 2:140.

Hepaticae

Aneura pinguis (L.) Dum. - with *Sphagnum.* 1:39.

Bazzania denudata (Torrey ex Gott. *et al.*) Trev. - bark and decayed wood. 1:88. The species consistently occurs with *Scapania bolanderi* and forms a distinct *Scapania bolanderi-Bazzania denudata* epiphytic community on *Alnus rubra, Thuja plicata* and *Tsuga heterophylla.*

B. tricrenata (Wahlenb.) Lindb. - bark and decayed wood. 4:313.

Blepharostoma trichophyllum (L.) Dum. subsp. *trichophyllum* - bark, decayed wood and rocks. 1:14.

Calypogeia azurea Stotler & Crotz - decayed wood. 2:129.

C. muelleriana (Schiffn.) K. Müll. - decayed wood. 3:245.

C. neesiana (Mass. & Carest.) K. Müll. - decayed wood. 2:231.

C. sphagnicola (H. Arnell et J. Perss.) Warnst, et Loeske. - with *Sphagnum*. 1:78.

C. suecica (H. Arnell et J. Perss.) K. Müll. - bark and decayed wood. 1:43.

Cephalozia bicuspidata (L.) Dum. - bark, decayed wood and soil. 1:6.

C. leucantha Spruce - decayed wood. 3:265. Superficially similar to *C. macounii*, but it is distinguished from the latter by its number of cells of lobes (4-5 cells wide at the base in contrast to 2-4 cells wide at the base of *C. macounii*), strongly transversely inserted leaves in contrast to subtransversely inserted leaves of *C. macounii* and irregularly lobed peritanth mouth with one-celled teeth in contrast to crenulate-minutely setaceous mouth with 1-3 celled teeth of *C. macounii*.

C. lunulifolia (Dum.) Dum. - bark, branch and decayed wood. 1:55.

C. macounii (Aust.) Aust. - decayed wood. 3:277.

Conocephalum conicum (L.) Lindb. - bark, rocks and soil. 1:24.

Diplophyllum albicans (L.) Dum. - bark, decayed wood and soil. 1:12.

D. plicatum Lindb. - bark and decayed wood. 3:253.

Frullania nisquallensis Sullivant - bark and decayed wood. 1:6.

Geocalyx graveolens (Schrad.) Nees - decayed wood and rocks. 1:81.

Gyrothyra underwoodiana M.A. Howe - soil. 3:262. This western endemic species was reported from Alaska, British Columbia, California, Oregon and Washington (Hong, 1987).

Jungermannia leiantha Grolle - rocks. 1:14.

Kurzia sylvatica (Evans) Grolle - decayed wood. 4:284.

Lepidozia reptans (L.) Dum. - bark and decayed wood. 1:19.

Lophozia incisa (Schrad.) Dum. - bark and decayed wood. 2:132.

Metzgeria conjugata Lindb. - bark and rocks. 1:27.

Moerckia hibernica (Hook.) Gott. - soil. 4:332.

Mylia taylori (Hook.) S. Gray - decayed wood and soil. 1:16.

Pellia endiviifolia (Dicks.) Dum. - soil. 2:151.

P. epiphylla (L.) Corda - soil. 2:230.

P. neesiana (Gott.) Limpr. - soil. 4:298.

Plagiochila asplenioides (L. emend. Taylor) Dum. subsp. *asplenioides* - moist soil. 4:309.

P. asplenioides subsp. *porelloides* (Torrey ex Nees) Schust. - soil and rocks. 4:355.

P. satoi Hatt. - rocks. 1:14.

Porella navicularis (Lehm. et Lindenb.) Lindb. - bark and decayed wood. 1:4.

Radula bolanderi Gott. - bark and branch. 1:32.

R. obtusiloba subsp. *polyclada* (Evans) Hatt. - rocks. 1:17.

Riccardia latifrons Lindb. - decayed wood and soil. 1:40.

R. multifida (L.) S. Gray - soil. 1:82.

R. palmata (Hedw.) Carruth. - bark and decayed wood. 1:6.

Scapania bolanderi Aust. - bark, decayed wood and soil. 1:1.

S. umbrosa (Schrad.) Dum. - bark, decayed wood and rocks. 1:22.

S. uliginosa (Sw. ex Lindenb.) Dum. - wet soil near stream. 2:232.

S. undulata (L.) Dum. - wet rocks and soil. 1:53.

S. undulata var. *oakesii* (Aust.) Buch - wet rocks and soil. 4:285.

The bryophyte flora of Ramsay Island contains 18 families, 21 genera and 25 species of Musci and 17 families, 23 genera, 38 species, 4 subspecies and a variety of Hepaticae. All of these taxa are reported from Ramsay Island for the first time. Among 25 species of Musci the following rare species were collected in the island.

1) *Heterocladium macounii* Best
2) *H. procurrens* (Mitt.) Rau & Herv. - In Canada the species is found only in British Columbia and is known in Idaho, Montana, Oregon and Washington.

Among 43 taxs of hepaticas of Ramsay Island, the following 5 endemic taxa and 3 North Pacific Arc taxa are recognized.

A. Western North American taxa:
1). *Frullania nisquallensis* Sullivant.
2). *Gyrothyra underwoodiana* Howe - Alaska, British Columbia, California, Oregon and Washington.
3). *Porella navicularis* (Lehm. et Lindenb.) Lindb.
4). *Radula bolanderi* Gottsche
5). *R. obtusiloba* subsp. *polyclada* (Evans) Hatt. - Alaska, British Columbia and Washington.

B. North Pacific Arc taxa:
1). *Diplophyllum plicatum* Lindb.
2). *Plagiochila satoi* Hatt.
3). *Scapania bolanderi* Aust.

The presence of 5 western North American endemic and 3 North Pacific Arc taxa represents 19% of the entire hapatic flora of the Ramsay Island (total 43 taxa) compared with 24.1% of entire hapatic flora of the Thermal Meadow (total 29 taxa, Hong *et al.* 1992).

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Literature Cited

Grolle, R. 1983a. Hepaticae of Europe including the Azores: an annotated list of species. *Journal of Bryology* 12: 403-459.

________. 1983b. Nomina Generica Hepaticarum: references, types and synonymies. *Acta Botanica Fennica* 121: 1-62.

Hong, W. S. 1987. The distribution of western North American Hepaticae. Endemic taxa and with a North Pacific Arc distribution. *The Bryologist* 90(4): 344-361.

_________. B. Deffinbaugh, R. Miller & B. Sparrow. 1992. A study of the bryophytes of Themal Meadow, Hotsprings Island, Queen Charlotte Islands, Canada. *Evansia* 9(3): 94-99.

Ireland, R. R., Brassard, G. B., Schofield, W. B. & D. H. Vitt. 1987. Checklist of the mosses of Canada II. *Lindbergia* 13(1-2): 1-71.

Vitt, D. H., Marsh, J. & R. Bovey. 1988. *Mosses Lichens & Ferns of Northwest North America.* Lone Pine Publishing. Edmonton.

Seel, K., J. McIntosh & R. Storeshaw. 1990. Provisional Resource Description & Analysis. 1-522 pp. South Moresby/Gwaii Haanas National Park Reserve. British Columbia, Canada.

Stotler, R. & B. Crandall-Stotler. 1977. A checklist of the liverworts and hornworts of North America. *The Bryologist* 80: 405-428.

Vitt, D.H. 1982. Sphagnopsida and Bryopsida. pp. 305, 307-336. In: S.P. Parker (ed.) *Synopsis and Classification of Living Organisms.* McGraw-Hill. New York.

Polytrichum hyperboreum (Polytrichaceae: Musci) reconfirmed in Maine

Bruce Allen[1]

Polytrichum hyperboreum R. Brown is a circumpolar species that according to Long (1985) reaches southward in eastern North America only to Labrador and northern Quebec. Grout (1940) reported the species from Maine [*North American Musci Perfecti* No. 397, *Polytrichum piliferum* var. *hyperboreum*, at foot of sloping ledges, summit N. peak of Tumbledown Mt., Berlin no. 6, Franklin Co., June 2 1940, *Adams* (MO, MICH)].

Polytrichum hyperboreum belongs to the *Polytrichum*-group with abruptly infolded upper leaf margins. In size and in its erect, closely appressed leaves it resembles *P. strictum* Brid., but *P. hyperboreum* lacks the dense, whitish tomentum that sets that species apart from others in the group. It has been treated as a variety of *P. piliferum* Hedw. (Frye 1937) but it is a much larger plant and has hairpoints that are hyaline only in the upper half. *Polytrichum hyperboreum* has also been considered a variety of *P. juniperinum* Hedw. (as *P. juniperinum* var. *arcticum* Kuc) but that species has entirely concolorous leaf hair-points and somewhat flexuous leaves.

The leaves of *P. hyperboreum* are densely spinose-toothed near the base of their hair-points. Other good taxonomic characters are found in its leaf lamellae. As noted and figured by Kuc (1973) the terminal cells of the leaf lamellae can be ovoid or pyriform and they are thin-walled at the apex (see Long 1985, Fig. 16). All of the other species noted above have very thick-walled terminal lamellae cells (see Long 1985, Figs. 15, 17, 18). Grout's *North American Musci Perfecti* No. 397 was cited by Crum and Anderson (1981) under *P. juniperinum*. This collection in MICH and MO is *P. hyperboreum*.

Acknowledgement. I thank Howard Crum for examining and verifying the identity of Grout's *North American Musci Perfecti* no. 397 at MICH.

Literature cited.

Crum H. A. & L. E. Anderson. 1981. Mosses of Eastern North America. Vol. 2. Columbia University Press, New York.

Frye, T. C. 1937. Polytrichaceae. *In* A. J. Grout (ed.), Moss Flora of North America North of Mexico 1(2): 99-128.

Grout, A. J. 1940. North American Musci Perfecti. Numbers 376-400. Newfane, Vermont.

Kuc, M. 1973. Bryogeography of expedition area, Axel Heiberg Island, N.W.T., Canada. Bryoph. Biblioth. 2: iv + 1-120.

Long, D. G. 1985. Illustrated moss flora of arctic North America and Greenland. 1. Polytrichaceae. Meddel. Grønland, Biosci. 17: 1-57.

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Two Collections of Delaware Lichens Separated by 100 Years

Oliver W. Crichton[1]

The Delaware lichens collected by Albert Commons, 1885-1896, are preserved in the herbarium of the Academy of Natural Sciences (PH) in Philadelphia. In 1961 W. L. Dix published a list of Commons' collection with habitat data and dates from the original labels. (Dix, W. L. 1961, "The Delaware Lichens Collected by Commons", The Bryologist 64:371-378.)

Retirement made it possible for me to revive a long held interest in lichens. In 1991 I attended the General Lichenology course taught by Dr. Sharon Gowan at the Eagle Hill Wildlife Research Station in Maine. The collection of Delaware lichens made by Albert Commons gave rise to the idea of comparing the lichen flora represented in Commons' collection with today's Delaware lichen flora. The identifications are my own except where noted. All keys used are cited in the references and nomenclature in most cases follows Egan (1987, 1989, 1990). All specimens I have collected are in my personal collection.

Tatnall in his "Flora of Delaware and the Eastern Shore" divides the Peninsula into two phytogeographic regions, the Piedmont Plateau and the Coastal Plain. Each of these, he states, "has a characteristic flora, differing in many interesting respects from the other". The boundary between the Piedmont and the Coastal Plain is known as the "Fall line". In comparing the two lichen collections which are separated by just over 100 years, I have divided the state (Fig.1) into four zones: the Piedmont of New Castle County in the north (P); the rest of the county which is Coastal Plain (N); and the Coastal Plain of Kent County (K); and that of Sussex County (S).

In reviewing Commons' collection I found that many identifications had been updated by I. M. Brodo, R.C. Harris, C. M. Wetmore and others since Dix published his paper. Dix listed 160 species but noted that a number of specimens were not "identifable enough to report". I have listed the total as 187 which can be accounted for by identification updates, by a few species missed by Dix and by some of Commons' lichens present in other herbaria (the New York Botanical Garden (NY) , the Farlow Herbarium (FH), and the University of Michigan Herbarium (MICH). Lichens at NY collected recently by others have also been included in my 1987-1994 list of species.

Air pollution and loss of habitat (especially in New Castle Co.) have undoubtedly played a role in eliminating some species and in limiting the distribution of other species to the less polluted and less built-up parts of the state, especially Sussex county. A comparison of the number of species collected in 1987-1994 with those collected 100 years ago is shown in Table 1. The figures for the state as a whole are misleading, however, because Commons collected in only four areas of Sussex County (Fig.1). Had he been able to collect more extensively in Sussex County he probably would have added 40-50 species to his collection, species which I have found only in Sussex County. As a result, the figures shown for the Piedmont alone and those for the whole of New Castle County probably come closer to the facts (Table 1).

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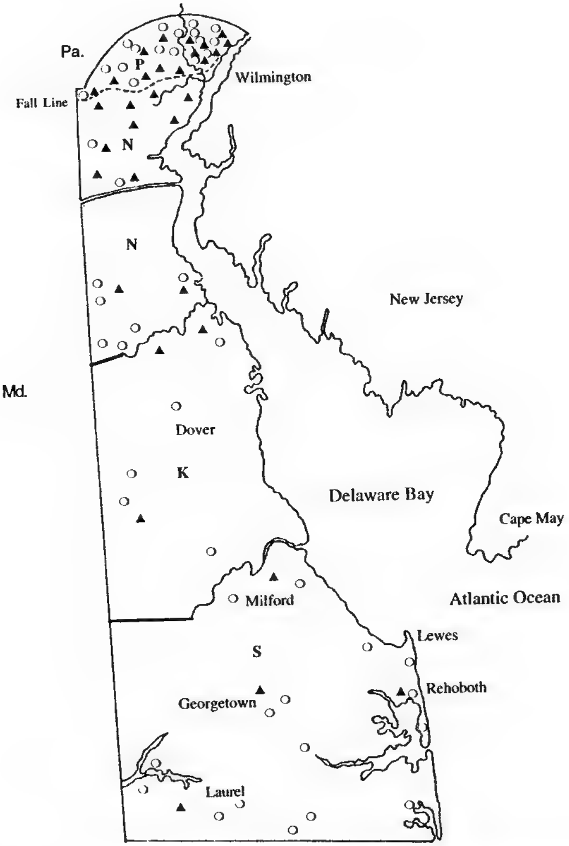

Figure 1. Location of collection areas within Delaware, ▲ = 1885-1896, ○ = 1987-1994. Piedmont New Castle Co. = P, Coastal Plain: New Castle Co. = N, Kent Co. = K, Sussex Co. = S.

Piedmont

	1885-1896 (T1)					1987-1994 (T2)			
	FO	Fr	Cr	Total		Fo	Fr	Cr	Total
T1	39	24	60	123	T2	15	6	25	46
T1+T2	13	7	16	36	T1+T2	13	7	16	36
Total	52	31	76	159	Total	28	13	41	82

New Castle County

T1	42	24	56	122	T2	15	13	26	54
T1+T2	14	10	17	41	T1+T2	14	10	17	41
Total	56	34	73	163	Total	29	23	43	95

State of Delaware

T1	39	17	55	111	T2	29	17	57	103
T1+T2	25	20	31	76	T1+T2	25	20	31	76
Total	64	37	86	187	Total	54	37	88	179

Table 1. Comparing counts of lichen species collected in 1885-1896 with those collected in 1987-1994. Fo= foliose lichens, Fr= fruticose lichens, and Cr= crustose lichens.

List of Species

The name of each species is followed by a time designation where T1=1885-1896 and T2=1985-1994. Distribution is indicated by one or more of the following: P= the piedmont of New Castle County; N= the coastal plain of New Castle County; K= the coastal plain of Kent County; S= the coastal plain of Sussex County. All T1 taxa are at PH except for those indicated as FH, MICH and NY. T2 numbered taxa are the authors except where noted otherwise.

Acarospora cervina var. *glaucocarpa* (Wahl. in Ach.) Körber-T2,P (OC-352).
Anaptychia palmulata (Mich.) Vainio -T1,P,N.
Anthracothecium prasinum (Eschw.) R. C. Harris -T2,S(OC-416).
Anisomeridum sp. -T2,S (OC-341).
Anzia colpodes (Ach.) Stisenb. -T1,S.
Arthonia caesia (Flötow) Körber -T1,P(NY); T2,S (OC-97).

A. sp. -T1,P,S; T2,S (OC-159).
Arthotheliun spectable Flötow ex Massal. -T1,P.
A. taediosum (Nyl.) Müll. Arg. -T1,P; T2,S (R. C. Harris 24932).
Aspicilia cinerea var. *laevata* (L.) Körber, R. C. Harris -T1,P; T2,P^2 (OC-51).
Bacidia inundata (Fr.) Körber -T1,P; T2,P(OC-364).
B. polychroa (Th. Fr.) Körber -T2,S(R. C. Harris 24915).
B. rubella (Hoffm.) Massal. -T1,P.
B. schweinitzii (Tuck.) A. Schneider -T1,P; T2,N^2,S(OC-241).
Baeomyces roseus Pers.(Galloway 1980) -T1,P,S.
Biatoria botryosa Fr. -T2,P(OC-337).
Buellia curatellae Malme -T1,P,N,K.
B. curtissii (Tuck.) Imsh. -T1,P,K,S; T2,N,K,S (OC-232).
B. modesta (Kremp.) Müll. Arg. -T2,S(R. C. Harris 24935).
B. polyspora (Willey) Vainio -T1,P; T2,P,N (OC-173).
B. punctata (Hoffm.) Massal. -T1,P,N,K,S; T2,S (OC-335).
B. stillingiana Steiner -T1,P,N,K,S; T2,P,K,S(OC-220).
B. turgescens Tuck. -T2,P(OC-350).
B. vernicoma (Tuck.) Tuck. -T1,S.
Calicium (abietinum Pers. ?) -T2,S(OC-274).
Caloplaca camptidia (Tuck.) Zahlbr. -T1,P.
C. cerina (Ehrh, ex Hedwig) Th. Fr. -T1,P.
C. citrina (Hoffm.)Th. Fr. -T1,P; T2,P(OC-196).
C. feracissima Magn. -T2,P(OC-325).
C. flavorubescens (Huds.) Laundon -T2,S(OC-46).
C. flavovirescens (Wulfn.) Dalla Torre & Sarn. -T1,P; T2,P,S(OC-334).
C. fraudens (Th. Fr.) H. Olivier -T1,P.
C. holocarpa (Hoffm.) Wade -T1,P.
C. schaereri (Flörke) Zahlbr, -T1,P.
C. sideritis (Tuck.) Zahlbr. -T1,P.
Candelaria concolor (Dickson) B. Stein -T2,P,N,S(OC-17).
C. fibrosa (Fr.) Müll. Arg. -T1,P.
Candelariella aurella (Hoffm.) Zahlbr. -T2,P(OC-92).
C. vitellina (Hoffm.) Müll,Arg. -T2,P(OC-374).
Canoparmelia caroliniana (Nyl.) Elix. & Hale -T2,S (OC-172).
Canoparmelia crozalsiana (B.de Lesd. ex Harm.) Elix. & Hale -T2,P (OC-182).
Catapyrenium lachneum (Ach.) R.Sant. -T1,P.
C. tuckermanii (Rev. ex Mont.) Thomson -T1,P.
Chaenotheca sp. -T2,S(OC-340).
Chrysothrix candelaris (L.) Laundon -T2,S (OC-125).
Cladina arbuscula (Wallr.) Hale & Culb. -T2,N,S(OC-170).
C. submitis (A. Evans) Hale & Culb. -T1,S; T2,S(OC-319).
C. subtenuis (des Abb.) Hale & Culb. -T1,P,N,S; T2,N,K,S(OC-152).

Cladonia abbreviatula G. K. Merr. -T1,N; T2,S(OC-253).
C. apodocarpa Robb. -T1,N,S; T2, N(OC-411).
C. atlantica A. Evans -T1,P,S; T2,P,K,S(OC-206).
C. bacillaris Genth. -T2,P,N,S(OC-91).
C. bacillaris Genth. "f. reagens" A. Evans -T2,P(OC-413).
C. beaumontii (Tuck.) Vainio -T2,S(OC-181).
C. caespitica (Pers.) Flörke -T1,P; T2,S(OC-13).
C. calycantha Nyl. -T2, N,S (OC-68).
C. cariosa (Ach.) Sprengel -T1,P.
C. cervicornis (Ach.) Flotow -T1,P.
C. chlorophaea (Flörke ex Sommerf.) Sprengel -T1,P.
C. coniocraea (Flörke) Spreng. -T1,P; T2,P,S(OC-66).
C. cristatella Tuck. -T1,P,N,K,S; T2,P,N,K,S(OC-1).
C. cryptochlorophaea Asah. -T1,P.
C. cylindrica (A. Evans) A. Evans -T2,P,S(OC-148).
C. decorticata (Flörke) Sprengel -T2,P,N,S(OC-205).
C. didyma (Fée) Vainio -T1,P.
C. floerkeana (Fr.) Flörke -T2,P,S(OC-233).
C. furcata (Huds.) Schrader -T1,P.
C. grayi G. K. Merr. ex Sandst. -T1,P,S; T2,P,N,K,S (OC-409).
C. humilis (With.) Laundon -T2,K(OC-412).
C. incrassata Flörke -T2, S(C.F.Reed 132000 NY;OC-254).
C. macilenta Hoffm. -T1,P; T2,N,S(OC-245).
C. mateocyatha Robb. -T1,P.
C. ochrochlora Flörke -T2,N,S(OC-22).
C. parasitica (Hoffm.) Hoffm. -T2,N,S(OC-16).
C. peziziformis (With.) Laundon -T1,P,N; T2,P,N(OC-67).
C. piedmontensis G.K. Merr. -T2,P,(OC-154).
C. pleurota (Flörke) Schaerer -T1,P.
C. polycarpia G. K. Merr. -T2,S(C. F. Reed 125539 NY).
C. polycarpoides Nyl. -T1,P; T2,P,N,K,S(OC-200).
C. pyxidata (L.) Hoffm. -T1,P,N.
C. rei Schaerer -T1,P.
C. robbinsii A. Evans -T1,P.
C. sobölescens (Nyl.) Vainio -T1,P; T2,S(OC-417).
C. squamosa (Scop.) Hoffm. -T1,P.
C. strepsilis (Ach.) Grognot -T1,P; T2,N,S(OC-201).
C. subradiata (Vainio) Sandst. -T2,P(C. F. Reed 132375 NY).
Collema conglomeratum Hoffm. -T1,P.
C. subflaccidum Degel. -T1,P(NY).
Coniocybe gracilescens Willey -T1,P.
Conotrema urceolatum (Ach.) Tuck. -T1,P,N.
Cyphelium tigillare (Ach.) Ach. -T1,P.

Dactylospora saxatilis var. *saxatilis* (Schaerer) Halfelln -T1,P.
Dermatocarpon luridum (With.) Laundon -T1,P; T2,P(OC-87).
Dermayocarpon miniatum (L.) Mann -T1,P.
Diatrypella sp. -T2,S(R. C. Harris 24905).
Dimerella lutea (Dickson) Trevisan -T1,N.
Ditremis nyssaegena (Elix & Everh.) Harris -T2,S(W. R. Buck 17779 NY).
Endocarpon pusillum Hedwig -T2,P(OC-209).
Eopyrenula leucoplaca (Wallr.) R. C. Harris -T1,P.
Flavoparmelia baltimorensis (Gyelnik & Fóriss) Hale -T1,P.
F. caperata (L.) Hale -T1,P,N,K,S; T2,P,N,K,S(OC-6).
Graphis anfractuosa Eschw. in Martius -T2,S(OC-249).
G. desquamescens (Fée) Zahlbr. -T2,S(OC-366).
G. (insidiosa?) (C. Knight & Mitten) J. D. Hook. -T2,S(OC-213).
G. lineola Ach. -T1,P.
G. scripta (L.) Ach. -T1,P; T2,P,S(OC-3).
G. tenella Ach. -T1,P.
G. sp. -T2,S(OC-359).
Gryostomum scyphuilferum (Ach.) Nyl. -T1,S.
Heterodermia hypoleuca (Muhl.) Trev. -T1,P; T2,S(OC-25).
H. obscurata (Muhl.) Trev. -T1,P; T2,S(OC-229).
H. speciosa (Wulfen) Trev. -T1,P; T2,P,N,S(OC-149).
Hyperphyscia adglutinata (Flörke) Magnh. & Poelt -T2,P(OC-163).
H. syncolla (Tuck. ex Nyl.) Kalb -T1,P; T2,S(OC-110).
Hypogymnia physodes (L.) Nyl. -T1,P,N.
Hypotrachyna formosana (Zahibr.) Hale -T1,S; T2,K(OC-406).
H. livida (Taylor) Hale -T1,P,N,K,S; T2,K,S(OC-101).
Imshaugia aleurites (Ach.) S. F. Meyer -T2,P,S(OC-193).
Juella fallaciosa (Stizenb. ex Arnold) R. C. Harris-T2,P,S(R. C. H.24916; OC-410).
Lecanora allophana Nyl. (Brodo & Vitikainen 1984) -T1,P.
L. cadubriae (Massal.) Hedl. -T1,P.
L. caesiorubella Ach. ssp. *prolifera* (Fink in Hedr.) R. C. Harris -T2,K,S(OC-236).
L. campestroides Brodo -T1,P.
L. chlarotera Nyl. -T2,S(OC-367).
L. cinereofusca Magn. var. *cinereofusca* (Brodo) -T1,S.
L. cupressi Tuck. -T1,S(NY).
L. dispersa (Pers.) Sommerf. -T2,P,S(OC-184).
L. hybocarpa (Tuck.) Brodo -T1,P,K,S T2,P,S^2(R. C. Harris 24941; OC-88).
L. imshaugii Brodo (Brodo 1984a) -T1,P,S(NY).
L. pallida (Schreber) Rabenh. -T1,P,N,K,S.
L. pseudistera Nyl. (Brodo 1984a) -T1,P.
L. strobilina (Sprengel) Kieffer -T1,P(NY),K; T2,P,N,S(OC-234).
L. thysanophora R. C. Harris -T2,N,S(OC-285).

L. varia (Hoffm.) Ach. -T1,P,N,K,S.
Lecidea carnulenta (Tuck.) Fink -T1,P.
L. cyrtidia Tuck. -T1,P; T2,P(OC-371).
L. erratica Körber -T2,P(OC-204).
L. nylanderi (Anzi) Th. Fr. -T2,N(OC-186).
L. russula Ach. -T1,P,S.
Lepraria finkii (B. de Lesd. in Hue.) R. C. Harris -T2,S(R. C. Harris 24947).
L. incana (L.) Ach. -T2,P,N(OC-21).
Leprolema membranaceum (Dickson)Vainio -T2,P(OC-191).
Leptogium chloromelum (Swartz ex Ach.) Nyl. -T1,P.
L. corticola (Taylor) Tuck. -T1,P,N.
L. cyanescens(Rabenh.) Körber -T1,P.
Leptogium hirsutum Sierk -T1,P.
L. milligranum Sierk -T1,P.
Lobaria pulmonaria (L.) Hoffm. -T1,P.
L. quercizans Michaux -T1,P,S.
Loxospora pustulata (Brodo & Culb.) R. C. Harris -T2,S(R. C. Harris 24948; OC-212).
Micarea prasina Fr. -T2S (R. C. Harris 24949).
Mycocaliciun albonigrum (Nyl.) Fink -T1,P.
Mycoporum compositum (Massal.) R. C. Harris -T1,P,S.
Myelochroa aurulenta (Tuck.) Elix & Hale -T1,P; T2,P,N,(OC-27).
M. galbina (Ach.) Elix & Hale -T1,P,N; T2S(OC-37).
Ochrolechia africana Vainio -T2,S^2(R. C. Harris 24951; OC-223).
O. pallescens (L.) Massal. -T1,P,S.
O. rosella (Müll. Arg.) Vers. -T2,S(OC-365).
O. tartarea (L.) Massal. -T1,P.
Opegraphia atra Pers. -T1,P.
O. rufescens Pers. -T2,N,K,S(OC-17).
Pannaria leucosticta (Tuck. in Darl.) Tuck. ex Nyl.-T1,S.
P. lurida (Mont.) Nyl. -T1,S.
Parmelia saxatilis (L.) Ach. -T1,P.
P. sulcata Taylor -T1,P; T2,P,N(OC-23).
Parmelinopsis horrescens (Taylor) Elix & Hale -T2,S(OC-242).
P. minarum (Vainio) Elix & Hale -T2,S(OC-111).
Parmeliopsis ambigua (Wulfen in Jacq.) Nyl. -T1,S.
P. hypertropa (Ach.) Arn. -T2,S(OC-414).
Parmotrema cetratum (Ach.) Hale -T1,K; T2,S(OC-115).
P. chinense (Osbeck) Hale & Ahti -T1,P,S.
P. dilatatum (Vainio) Hale -T2,K,S(OC-28).
P. eurysacum (Hue) Hale -T2,S(OC-130).
P. hypoleucinum (Steiner) Hale -T2,S(OC-322).
P. hypotropum (Nyl.) Hale -T1,P,N,K,S; T2,P,N,K,S(OC-106).
P. mellissii (Dodge) Hale -T2,S(OC-210).

P. michauxianum (Zahlbr.) Hale -T2,S(R. C. Harris 24955; OC-77).
P. perforatum (Jacq.) Massal. -T1,P,N,K,S; T2,S(R. C. Harris 24956; OC-10).
P. reticulatum (Taylor) M. Choisy -T1,S; T2,P,K,S(OC-94).
P. rigidum (Lynge) Hale -T2,S(OC-131).
P. subisidiosum (Müll. Arg.) Hale -T2,S(OC-226).
P. tinctorum (Delise ex Nyl.) Hale -T2,S(OC-134).
Peltigera aphthosa (L.) Willd. -T1,P,N.
P. canina (L.) Willd. -T1,P,S.
P. leucophlebia (Nyl.) Gyelnik -T1,P(NY).
P. polydactyla (Necker) Hoffm. -T1,P.
P. rufescens (Weis) Humb. -T1,P,N.
Pertusaria amara (Ach.) Nyl. -T1,S; T2,S(OC-281).
P. geminipara (Th. Fr.) C. .Knight ex Brodo -T1,P.
P. glomerata (Ach.) Schaerer -T1,P.
P. hymenea (Ach.) Schaerer -T1,P.
P. leucostoma (Bernh.) Massal. -T1,P.
P. macounii (Lamb) Dibben -T2,K,S(OC-43).
P. multipunctoides Dibben -T2,S(R. C. Harris 24912).
P. paratuberculifera Dibben -T2,S(OC-93).
P. propinqua Müll. Arg. -T1,P.
P. pustulata (Ach.) Duby -T1,P; T2 ,S(R. C. Harris 24957).
P. trachythallina Erichsen -T2,S(OC-314).
P. velata (Turner) Nyl. -T1,P,N,K,S.
P. xanthodes Müll. Arg. -T2,K,S(OC-312).
Phaeographis dendritica (Ach.) Müll. Arg. -T1,P.
P. cf. inusta (Ach.) Müll. Arg. -T1,P(NY); T2,S(OC-348).
Phaeophyscia adiastola (Essl.) Essl. -T2,P,N(OC-128).
P.cernohorskyi (Nádv.) Essl. -T1,P(NY); T2,P,K,S(OC-113).
P. ciliata (Hoffm.) Moberg -T1,P; T2,S(OC-323).
P. orbicularis (Necker) Moberg -T1,P.
P. pussilloides (Zahlbr.) Essl. -T2,P(OC-99).
P. rubropulchra (Degel.) Moberg -T1,P; T2,P,N,S(OC-125).
P. sciastra (Ach.) Moberg -T2,P(OC-24).
Phlyctis sp. -T2,S(OC-362).
Physcia adscendens (Fr.) H. Olivier -T2,P,S(OC-40).
P. aipolia (Ehreh. & Humb.) Fürnr. -T1,P; T2,S(OC-36).
P. americana G. K. Merr. in A. Evans & Meyrow. -T1,P,N; T2,N,K,S(OC-150).
P. millegrana Degel. -T1,P,N,K,S; T2,P,N,K,S(OC-7).
P. phaea (Tuck.) Thomson -T1,P.
P. stellaris (L.) Nyl. -T1,P,N,K,S; T2,P,S(OC-228).
P. subtelis Degel. -T2,P(OC-19).
Physciella chloantha (Ach.) Essel. -T2,P,S(OC-127).

Physconia grisea (Lam.) Poelt -T1,P.
Placynthiella uliginosa (Schrader) Coppins & P. James -T2,P(OC-342).
Platismatia tuckermanii (Oakes) Culb. & C. Culb. -T1,P.
Polysporina simplex (Davies) Vezda -T1,P; T2,P,S(OC-218).
Porina pulla (Ach.) Müll. Arg. -T1,P,N; T2,P(OC-369),S(R. C. Harris 24960).
P. sp. -T2,S(OC-368).
Porpidia albocaerulescens (Wulfen) Hertel & Knoph -T1,P; T2,P(OC-84).
P. crustulata (Ach.) Hertel & Knoph -T2,P(OC-339).
P. macrocarpa (DC. in Lam. & DC.) Hertel Schwab -T1,P.
Pseudevernia consocians (Vainio) Hale & Culb. -T1,P.
Pseudocyphellaria aurata (Ach.) Vainio -T1,P,S.
Punctelia rudecta (Ach.) Vainio -T1,P,N,K,S; T2,P,N,K,S(OC-2).
P. subrudecta (Nyl.) Krog. -T2,P,K,S(OC-26).
Pycnothelia papillaria Dufour -T1,P; T2,S(OC-264).
Pyrenula apistea (Afzel. ex Ach.) Ach. -T1,P.
P. citriformis R. C. Harris -T1,P(NY).
P. concatervans (Nyl.) R. C. Harris -T1,P(MICH).
P. laevigata (Pers.) Arnold -T1,S.
P. plittii R. C. Harris -T1,P.
P. pseudobufonia (Rehm) R. C. Harris -T1,P,S.
P. pyrenuloides (Mont.) R. C. Harris -T1,S.
P. subelliptica (Tuck. in Lea) R. C. Harris -T1,P.
P. thelomorpha Tuck. -T1,S(FH).
Pyrrhospora (*varians* ? (Ach.) R. C. Harris) -T1,P; T2,P,N,K,S(OC-214).
Pyxine albovirens (G. K. Meyer) Aptroot -T2,P,K,S(OC-227).
P. eschweileri (Tuck.) Vainio -T2,S(OC-419).
P. sorediata (Ach.) Mont. -T1,P,S.
Ramalina americana Hale -T1,P(NY)S; T2,S(OC-55).
R. calicaris (L.) Fr. -T1,S.
R. fraxinea (L.) Ach. T1,P,N,K.
R. willeyi R. Howe -T1,P.
Rhizocarpon geminatum Körber -T1,P,S.
R. obscuratum (Ach.) Massal. -T1,P; T2,P(OC-354).
R. subgeminatum Eitner (Wetmore 1981) -T2,P(OC-306).
Rinodina ascociscana Tuck. -T1,K; T2,P,N,S(OC-351).
R. confragosa (Ach.) Körber -T1,P.
R.exigua (Ach.) Gray -T1,P,K.
R. millaria Tuck. -T2,P,S(OC-157).
Rinodina pachyspermia Magn. -T2,S(OC-219).
Sarcogyne regularis Körber -T2,P,S(OC-208).
Scoliosporum umbrinum (Ach.) Arnold -T1,P; T2,P(OC-338).
Sphinctrina sp. -T2,S(OC-418).
Sticta beauvoisii Delise -T1,P(NY).

Teloschistes chrysophthalmus (L.) Th. Fr. -T1,P,N.
Tephromela atra (Huds.) Hafellner -T1,(P); T2,P(OC-361).
Thelocarpon sp. -T2,S(OC-353).
Thelotrema subtile Tuck. -T1,P,S.
Trapelia coarctata (Sm.) Choisy -T2,P(OC-203).
T. involuta (Taylor) Hertel -T2,P(OC-336).
Trypethelium virens Tuck. ex Michen. -T1,P,N,S; T2,K,S(OC-224).
Tuckermannopsis americana (Sprengel) Hale -T1,P(NY),S.
T. ciliaris (Ach.) Gyelnik -T1,P,S; T2,S(OC-4).
T. fendleri (Nyl.) Hale -T1,N.
T. juniperina (L.) hale -T1,S.
Usnea lapponica Vainio -T2,S(OC-53).
U. mutabilis Stirton -T2,S(OC-34).
U. pensylvanica Mot. -T1,S.
U. rubicunda Stirton -T1,P; T2,S(OC-95).
U. strigosa (Ach.) A. Eaton -T1,P,N,K,S; T2,S(OC-52).
U. subfloridana Stirton -T2,S(OC-50).
U. trichodea Ach. -T1,P,N; T2,S(OC-238).
Verrucaria aethiobola Wanlenb. in Ach. -T2,P(OC-190).
V. calkinsiana Servit - T2,P(OC-420).
V. muralis Ach. -T2,P(OC-82).
V. nigrescens Pers. -T2,P,N(OC-174).
Xanthoparmelia angustiphylla (Gyelnik) Hale -T2,P(C. F. Reed 132133 NY).
X. conspersa (Ehrh. ex Ach.) Hale -T1,P.
X. cumberlandia (Gyelnik) Hale -T1,P(NY); T2,P(OC-58).
X. somloënsis (Gyelnik) Hale -T1,P.
X. subramigera (Gyelnik) Hale -T2,P(OC-101).
Xanthoria candelaria (L.) Th. Fr. -T2,S(OC-18).
X. fallax (Hepp in Arnold) Arnold -T2,K(C. F. Reed NY).
X. lobulata (Flörke) B. de Lesd. -T1,P.
Zamenhofia hibernica (P. James & Swinscow) Claux. & Roux -T2,N,S(OC-251).

[2] Determined by R. C. Harris, Oct. 1989.

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Literature Cited

Brodo, I. M. 1968. The Lichens of Long Island, New York: A Vegetational and Flouristic Analysis. *New York State Museum and Science Service Bulletin* 410: 111-299.

____1988. Lichens of the Ottawa Region, 2nd. Ed. *Ottawa Field Naturalist's Club Spec. Pub. No.3*, National Museum of Natural Sciences, Ottawa, Ont. Canada.

____& W. L. Culberson, 1986. *Haematomma* (now *Loxospora*) *pustulatum*, sp. nov. (Ascomycoyina, Haematommataceae): A common, widespread, sterile Lichen of Eastern North America. *The Bryologist* 89(3): 203-205.

Dix, W. L. 1961. The Delaware Lichens Collected by Commons. *The Bryologist* 64: 371-378.

Dobson, F. 1981. *Lichens: an Illustrated Guide*. The Richmond Pub. Co. Ltd. Orchard Road, Richmond, Surrey, England.

Egan, R. S. 1987. A Fifth Checklist of the Lichen-forming, Lichenicolous and allied Fungi of the Continental United States and Canada. *The Bryologist* 90(2): 77-173.

____ 1989. Changes to the"Fifth Checklist of Lichens". *The Bryologist* 92(1): 68-72.

____ 1990. Changes to the "Fifth Checklist of Lichens". *The Bryologist* 93(2): 211-219.

Fink, B. 1935. *The Lichen Flora of the United States*. Ann Arbor. 426 p.

Gowan, S. P. 1989. The Lichen Genus Porpidia (Porpidaceae) in North America. *The Bryologist* 92(1): 25-29.

____ and I. M. Brodo. 1988. The Lichens of Fundy National Park, New Brunswick,Canada. *The Bryologist* 91(4): 255-325.

Hale, M. E. 1979. *How to Know the Lichens*, 2nd. Ed. Wm. C. Brown Co., Dubuque.

____1986. Flavoparmelia, A new Genus in the Lichen Family Parmeliaceae (Ascomycotina). *Mycotaxon* 25(2): 603-605.

____1987. A Monograph of the Lichen Genus *Parmelia* Acharius sensu stricto (Ascomycotina, Parmeliaceae). *Smithsonian Contributions to Botany* No.66.

____1990. A Snopsis of the Lichen Genus *Xanthoparmelia* (Vainio) Hale (Ascomycotina, Parmeliaceae) *Smithsonian Contributions to Botany* No. 7.

Harris, R. C. 1973. The Corticolous Pyrenolichens of the Great Lakes Region. *The Michigan Botanist*. 12(1): 3-68.

_____1989. *Sussex County, Delaware: Ellendale State Forest, & Delaware Wild Lands, Cypress Swamp Conservation Area*. Xerox of lichens listed in notebook ,collected Oct. 25-26, 1989.

_____1989. A Sketch of the Family Pyrenulaceae (Melanommatales) in Eastern North America. *Memoires of the New York*

Botanical Garden, 49: 74-107.

_____1990. *Some Florida Lichens*. Published by the author, Bronx New York. 109 p.

Richardson, D. H. S. 1992. Pollution Monitoring with Lichens. *Naturalist's Handbook* 19. Richmond Pub. Co. Ltd. 76p.

Tatnall, R. R. 1946. *Flora of Delaware and the Eastern Shore*. Published by The Society of Natural History of Delaware.

Thompson, J. W. 1967. *The Lichen Genus* Cladonia *in North America*. Toronto.

Skorepa, A. C. *Key to the Crustose Genera Expected in Maryland*. 8 mimeo. pages, printed by author.

Wirth, V. 1987. *Die Flechten Baden-Württembergs Verbreitunglas*. Stuttgart: Ulmer.

Wong, P. Y. and I. M. Brodo. 1992. The Lichens of Southern Ontario, Canada. *Canadian Museum of Nature Syllogeus* No. 69.

State and County Moss Records for Arkansas

Piers Majestyk[1]

Abstract. *New distributional records of mosses are given for ten counties in Arkansas.* Astomum phascoides *(Hook. ex Drumm.) Grout and* Leskea polycarpa *Hedw. are reported new to the state.*

A total of 100 county and two state moss distributional records have been identified from ten Arkansas counties. These counties and their four-letter abbreviation are: Arkansas (ARKA), Clark (CLAR), Dallas (DALL), Garland (GARL), Grant (GRAN), Hot Spring (HSPR), Montgomery (MONT), Ouachita (OUAC), Pike (PIKE), and Union (UNIO).

Voucher specimens of all species collected are deposited in the herbarium of Henderson State University, Arkadelphia, Arkansas. Nomenclature for the most part follows that of Anderson *et al.* (1990). New state records are identified with an asterisk (*).

For additional references concerning distributional records of Arkansas mosses consult Redfearn (1994).

Anomodon attenuatus (Hedw.) Hüb. [CLAR, GRAN, HSPR, MONT, PIKE]
A. rostratus (Hedw.) Schimp. [GRAN, PIKE, UNIO]
**Astomum phascoides* (Hook. *ex* Drumm.) Grout [CLAR]
Atrichum angustatum (Brid.) Bruch & Schimp. *in* B.S.G. [DALL, GRAN, OUAC, UNIO]
Brachythecium acuminatum (Hedw.) Aust. [CLAR]
Bruchia flexuosa (Sw. *ex* Schwaegr.) C. Müll. [HSPR]
Bryum argenteum Hedw. [CLAR, GRAN]
Campylium chrysophyllum (Brid.) J. Lange [GRAN]
C. hispidulum (Brid.) Mitt. [GRAN]
Campylopus talluensis Sull. & Lesq. [PIKE]
Clasmatodon parvulus (Hampe) Hook. & Wils. *in* Sull. [ARKA, DALL, GRAN, HSPR, UNIO]
Climacium americanum Brid. [GRAN, UNIO]
Cryphaea glomerata Bruch & Schimp. *ex* Sull. [UNIO]
Dicranella heteromalla (Hedw.) Schimp. [PIKE]
Ditrichum pallidum (Hedw.) Hampe [GRAN, OUAC, UNIO]
Entodon macropodus (Hedw.) C. Müll. [PIKE]
E. seductrix (Hedw.) C. Müll. [DALL, GRAN, OUAC]
Fissidens bushii (Card. & Thér.) Card. & Thér. [CLAR, PIKE]
F. ravenelii Sull. [HSPR]
F. subbasilaris Hedw. [MONT]
Forsstroemia trichomitria (Hedw.) Lindb. [ARKA, DALL, GRAN, HSPR, UNIO]
Funaria flavicans Michx. [GRAN]

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F. hygrometrica Hedw. [HSPR]
Haplocladium microphyllum (Hedw.) Broth. [CLAR, GARL, GRAN, UNIO]
H. virginianum (Brid.) Broth. [CLAR]
Homomallium adnatum (Hedw.) Broth. [MONT]
Hypnum lindbergii Mitt. [GRAN]
Isopterygium tenerum (Sw.) Mitt. [GRAN, UNIO]
Leskea australis Sharp [GARL]
**L. polycarpa* Hedw. [HSPR]
Leucobryum albidum (Brid. *ex* P.-Beauv.) Lindb. [CLAR, GRAN HSPR, PIKE, UNIO]
Leucodon julaceus (Hedw.) Sull. [ARKA, GRAN]
Orthotrichum ohioense Sull. & Lesq. *in* Aust. [PIKE]
O. strangulatum P.-Beauv. [CLAR]
Philonotis fontana (Hedw.) Brid. [PIKE]
P. gracillima Ångstr. [PIKE]
Plagiomnium ciliare (C. Müll.) T. Kop. [UNIO]
Platygyrium repens (Brid.) Schimp. *in* B.S.G. [GRAN, PIKE]
Pogonatum brachyphyllum (Michx.) P.-Beauv. [DALL, OUAC]
Polytrichum commune Hedw. [OUAC, UNIO]
Pseudotaxiphyllum elegans (Brid.) Iwats. [PIKE]
Ptychomitrium drummondii (Wils.) Sull. [GARL, HSPR]
Schistidium apocarpum (Hedw.) Bruch & Schimp. [MONT]
Sematophyllum adnatum (Michx.) Britt. [PIKE]
Sphagnum affine Ren. & Card. [HSPR, UNIO]
S. lescurii Sull. *in* Gray [OUAC]
S. palustre L. [PIKE]
Steerecleus serrulatus (Hedw.) Robins. [DALL, GRAN, UNIO]
Taxiphyllum taxirameum (Mitt.) Fleisch. [PIKE]
Thelia hirtella (Hedw.) Sull. *in* Sull. & Lesq. [CLAR, GRAN, UNIO]
Thuidium delicatulum (Hedw.) Schimp. *in* B.S.G. [OUAC, UNIO]
T. recognitum (Hedw.) Lindb. [GRAN]
Tortella humilis (Hedw.) Jenn. [CLAR, OUAC]
Weissia controversa Hedw. [CLAR, DALL, PIKE]

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Literature Cited

Anderson, L. E., H. A. Crum & W. R. Buck. 1990. List of the mosses of North America north of Mexico. *The Bryologist* 93: 448-499.

Redfearn, P. L., Jr. 1994. *Checklist of the Mosses of the Interior Highlands of North America in Arkansas, Illinois, Missouri and Oklahoma.* Ozarks Regional Herbarium, Southwest Missouri State University, Springfield, Missouri.

New Field Tools

Bruce McCune[1]

In the last couple of years I have found a couple of new tools that other readers might find helpful. They won't help you sequence DNA but they may make your field work easier.

A carbide-tipped hand chisel sold by Miners Inc. ($39.50, cat. no. AO 601) is without doubt the best rock chisel I have ever used. After several years of frequent use, including on the hardest basalts and granites, the edge is essentially like new. (I did chip the tip of one of these, but the supplier replaced it without charge.) The tip has a tungsten carbide inset. It is slimmer and lighter weight (7 oz.) than the common rock chisels (mostly 16 oz. or more) available through many suppliers of field equipment. Miners Inc. is at PO Box 1301, Riggins, ID 83549-1301 (800-824-7452). You will enjoy browsing their catalog for other equipment, such as a wide selection of UV lamps, Hubco's Tyvek sample bags for elemental analysis, and many other kinds of field equipment.

I have tried several illuminated magnifiers, but found that all delivered a poor image -- until I tried Bausch and Laumb's, available through Forestry Suppliers ($43.75, cat. no. 61023, 800-543-4203). About the size of a large candy bar, and powered by two AA batteries, it has bright light sources at two different angles, selected by a switch. Compared to good hand lenses, the lens is somewhat lower power (7X) but is fairly wide (about 15 mm). An optional 10X lens is available but I haven't tried it.

You can buy a finely graduated (0.1 mm) reticle for the 7X version. The reticle works ok, but to focus on both the object and scale, I have to hold my eye farther from the lens than I normally do. The real value of this magnifier, however, is from the built-in lights paired with a decent lens. I have found this very handy for field work -- tents and motel rooms seem to be dimly lit. It is also be useful for non-destructive reading of permanent plots. For example, to use a hand lens on a lichen or bryophyte on a permanent plot on a tree trunk or rotten log requires you to get so close that most of the light is blocked.

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The Calyptra of *Fissidens polypodioides*

Ronald A. Pursell[1] & Bruce H. Allen[2]

Fissidens polypodioides Hedw. is a large and distinctive moss found in the southern United States (with a disjunct population in Indiana) and the neotropics. The species also occurs in Asia where until recently it was known as *F. areolatus* Griff. (Pursell et al. 1992). Specimens of this species with intact opercula are rare (Pursell et al. 1992). More rare, however, are specimens with calyptrae.

A survey of descriptions (Bartram 1949; Crum & Anderson 1982; Crum & Steere 1957; Gangulee 1971; Grout 1943; Hedwig 1801; Iwatsuki & Suzuki 1982; Lin 1985; Pursell 1994) of the species (some as *F. areolatus*) has shown that the calyptra is undescribed. A collection made recently in Belize, Allen 15200 (MO), contains not only sporophytes with intact opercula but also calyptrae, enabling us to describe and illustrate the calyptra for the first time.

Three calyptrae were found in the collection. These measure 1.50 - 1.55 µm in length, and cover only the opercula (fig. 1). The calyptrae are smooth and cucullate (figs. 1 & 2), and have lacerated and uneven lower margins (figs. 2 & 4).

Literature Cited

Bartram, E. B. 1949. Mosses of Guatemala. *Fieldiana. Bot.* 25: i-v; 1-442.

Crum, H. A. & L. E. Anderson. 1982. *Mosses of Eastern North America.* Volume 1. New York.

_____ & W. C. Steere. 1957. The Mosses of Porto Rico and the Virgin Islands. *Sci. Surv. Porto Rico & Virgin Islands.* 7 (4): 395-599.

Hedwig, J. 1801. *Species Muscorum Frondosorum.* Lipsiae.

Gangulee, H. C. 1971. *Mosses of Eastern India and Adjacent Regions.* A monograph. Fascicle 2. Calcutta.

Grout, A. J. 1943. Fissidentaceae. *N. Amer. Fl.* 15 (3): 167-202.

Iwatsuki, Z. & T. Suzuki. 1982. A taxonomic revision of the Japanese species of *Fissidens* (Musci). *J. Hattori Bot. Lab.* 51: 329-508.

Lin, Z.-H. 1985. A revision of the Chinese species of *Fissidens* (Musci, Fissidentaceae). *Acta Bot. Fenn.* 129: 1-65.

Pursell, R. A. 1994. Fissidentaceae. In: A. J. Sharp, H. Crum & P. M. Eckel (eds.). The Moss Flora of Mexico. *Mem. New York Bot. Gard.* 69.

_____, M. A. Bruggeman-Nannenga & Z. Iwatsuki. 1992. Species of *Fissidens* (Fissidentaceae, Musci) common to the neotropics, Asia and Africa. *Bryobrothera* 1: 49-55.

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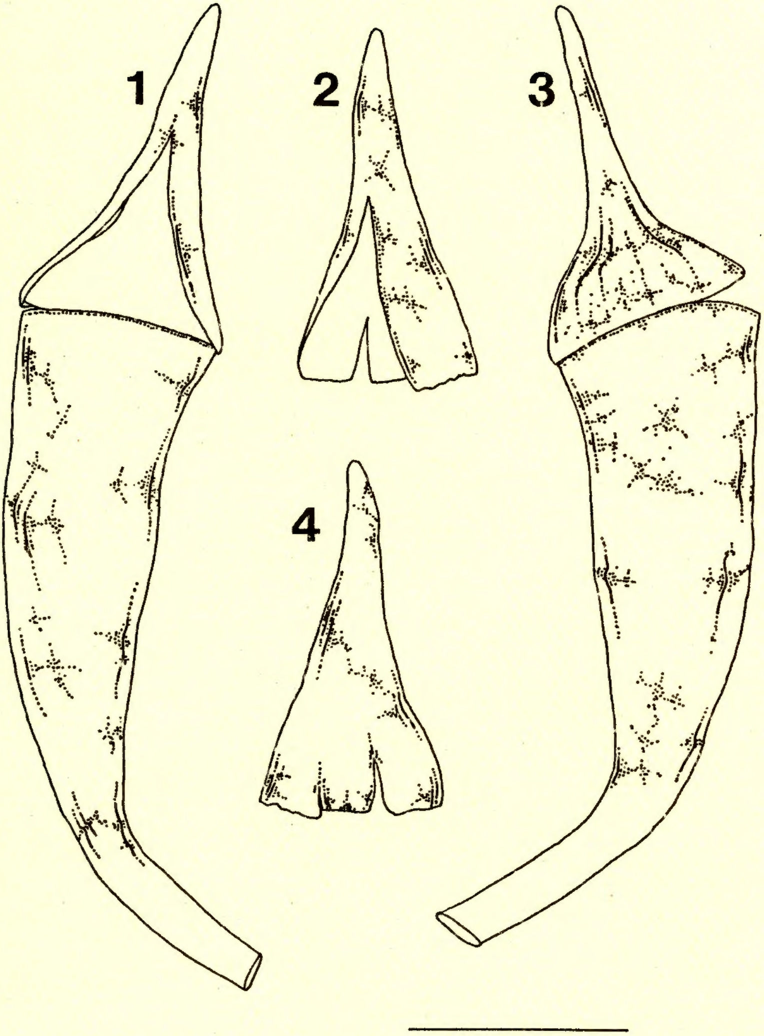

Figures 1-4. *Fissidens polypodioides*. 1. Capsule, operculum, and calyptra. 2. Calyptra, front view. 3. Capsule and operculum. 4. Calyptra, back view. Scale = 1 mm.

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